May, 1958 Vol. 47 No. 5

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION

The Shop Teachers' Professional Magazine

REQUISITION NUMBER

Who built the United States?

The "United States" is the name of the fastest, safest, most luxurious ship ever built on these shores. And the United States is the name of the greatest country in the world. When you ask, "Who built the United States?" it does not matter which is meant. The answer is the same in either case.

The United States was built by men of vision, men of achievement, men of creative genius. But where do men of such talents come from? History has demonstrated talents are not hereditary. Distinguished engineers have almost always come from average homes. As youths they were no different than the lads who crowd our classrooms today.

Creative genius, the spark of achievement, slumbers in every student! Whether or not it is fanned into a flame before the spark smothers, decides the future. Sometime in the formative days of youth there is a turning point . . . when the man of tomorrow clears his thinking, starts training himself in weighing values, learns that discrimination between the good and shoddy which so definitely marks every man who rises to great success.

The selection of the right drawing instruments frequently marks this turning point. For usually these are the first fine possessions ever to come into his hands. They initiate him into the discipline which he must have, the sensitive craftmanship which is the mark of his profession. Chosen with care, his set can give him pride of possession, then pride in work. It can open the world of imagination to him, give him a new vista of creative achievements, stimulate his ambition and lift his ability. The slightly higher cost of *fine* instruments is nothing at all when measured over their years of service and certainly an investment in success which should never be denied.

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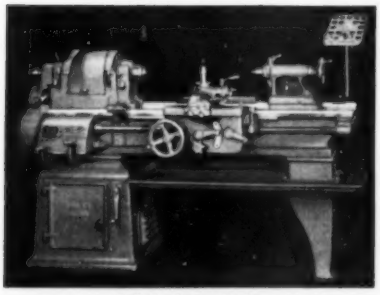
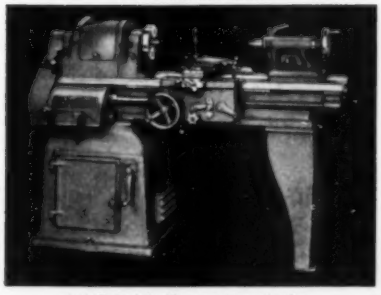


16" Toolroom Lathe



14½" Quick Change Gear Lathe

13" Toolroom Lathe

10" Quick Change Gear Lathe

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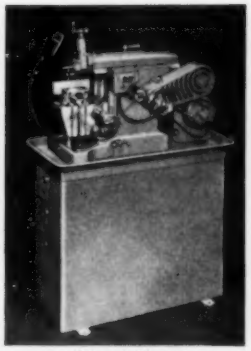
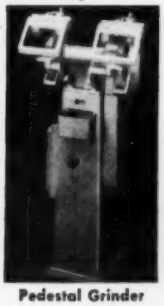
14" Drill Press

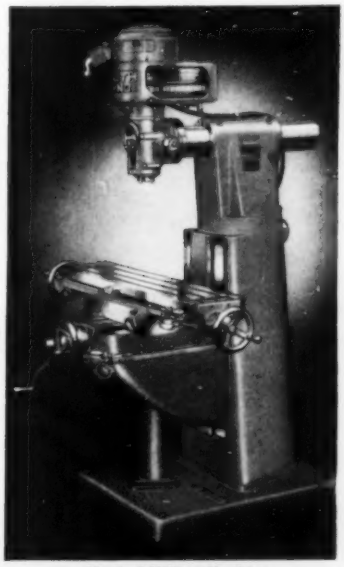


7" Bench Shaper

9" Floor Lathe

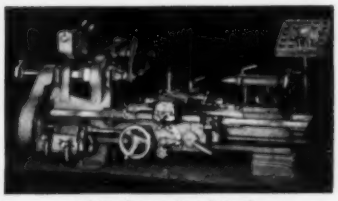


Pedestal Grinder

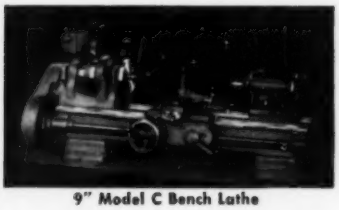


Vertical Milling Machine

10-K Toolroom Bench Lathe



9" Toolroom Bench Lathe



9" Model C Bench Lathe

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Six new Delta 12" variable speed wood lathes were chosen for service in Springfield, Ill. junior and senior high school shops. Here's why: *"They have just about every operating, safety and construction feature we could possibly want,"* says Alfred A. Redding, vocational education director. "Dollar for dollar we feel we've made a good buy—and are building our shop program on a sound basis."

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ROCKWELL

MAY
1958

VOL. 47 NO. 5

Industrial Arts and Vocational Education

The Shop Teachers' Professional Magazine

Published on the 15th of the month preceding the date of issue by THE BRUCE PUBLISHING CO., 400 North Broadway, Milwaukee 1, Wis. • CENTRAL OFFICE: 20 North Wacker Drive, Chicago 6, Ill. • EASTERN OFFICE: 233 Broadway, New York 7, N. Y.

★ ★ ★

This Month's Cover

The picture on this issue of the magazine shows students David Nixon and John Firenze with Dr. William Bettencourt at work in the mechanical drawing department at the Belmont Senior High School, Belmont, Mass.

The photograph was taken by Herbert Castro, Purdy Photographs, Boston, Mass., and sent to us by Dr. Bettencourt.

★ ★ ★

Summer School

In planning your vacation time activities, it is well to consider the prospect of attending summer school. The time to arrange for summer school attendance is now, and for your convenience, a list of teacher education institutions is given on page 154, of this issue.

★ ★ ★

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CONTENTS

Discernible Trends in Industrial Arts for the Last Half Century ..... *Marshall L. Schmitt* 141
The Role of Art in Industrial Arts ..... *Donald G. Lux* 145
Cartoon ..... *William S. Hanks* 146
A Course of Study in Ranching ..... *John W. Maurice* and *Benjamin J. Novak* 147
Vocational-Technical and Industrial Arts Education ..... *Frank E. Supplee* 149

Editorials:
Are You Going to Summer School? 154
Some Things To Do in May 154
Driving Safely 154
Automotive Instruction in General Education ..... *E. Robert Rudiger* 155
Satellites and Missiles ..... *W. G. Hjertstedt* 157

Problems and Projects

Nerve-Racking Shop Problems ..... *C. T. Stott* 158
Engineering Drafting Change Notices ..... *Herbert W. Yankee* 158
School Calendar ..... *Ben Taubenfeld* 159
Electrical Wiring With Snaps ..... *A. E. McPhee* 162
Roll-Around Book and Magazine Rack ..... *Roland Bacon* 162
Inexpensive Dust Collectors for the Woodshop ..... *Omer K. McCaleb* 164
Whittling Project — Mr. and Mrs. Penguin ..... *Ben Hunt* 166
Squaring-Shear Safety ..... *Carl H. Hubachek* 166
General Education in Industrial Arts ..... *Alexander F. Bick* 167
Strong Modern Tapered Legs ..... *Edward J. Kandare* 170
The Sturdy Oak ..... *Orville A. Oaks* 170
Architectural Terms ..... *N. M. Pittman* 171
Shop Safety Posters ..... *Brother Leo Geiger, C.S.C.* 172
Candlestands and Candelabra ..... *R. A. Tomkiewicz* 30A
An International Triumph for Industrial Arts Education ..... *John M. Fontana* 30A
Content and Scope of Industrial Arts in Independent Schools ..... *Samuel C. Beeler* 33A

Association News 4A
Personal News 22A
News Notes 25A
New Publications 42A
Business and Personal News 46A
Descriptive Material 48A
Shop Equipment News 54A

Association News

COMING CONVENTIONS

Apr. 25–26. Connecticut Industrial Arts Association, at Teachers College of Connecticut, New Britain, Conn. Secretary, George Metz, Amity Regional High School, Woodbridge, Conn.

Apr. 29–May 2. American Industrial Arts Association, at Hotel Statler, Boston, Mass. Secretary, Dr. Kenneth W. Brown, P.O. Box 2626, Buffalo 26, N. Y.

May 3. Virginia Council of Industrial Education Clubs, at Lynchburg, Va. Secretary, Ralph Lewis, Annandale High School, Annandale, Va.

May 8–9. Oswego Industrial Arts Spring Conference, at Teachers College, Oswego, N. Y. Secretary, Dr. John A. Storm, Teachers College, Oswego, N. Y.

June 9–13. Idaho Vocational Association, at Idaho State College, Pocatello, Idaho. Executive secretary, William Swenson, 610 Main St., Boise, Idaho.

June 9–14. Colorado Vocational Association, at Colorado State University, Fort Collins, Colo. Secretary, C. O. Banta, director of vocational education, Trinidad Junior College, Trinidad, Colo.

June 12–13. Georgia Vocational Association, at Biltmore Hotel, Atlanta, Ga. Secretary, R. E. Hagen, 232 Pryor St. N.W., Atlanta, Ga.

Aug. 11–12. American Technical Education Association, at Buffalo, N. Y. (jointly with A.V.A.). Secretary, Richard Howrs, State Office Building, Hartford, Conn.

Aug. 11–14. American Vocational Association, at Hotel Statler, Buffalo, N. Y. Secretary, Lowell A. Burkett, 1010 Vermont Ave. N.W., Washington, D. C.

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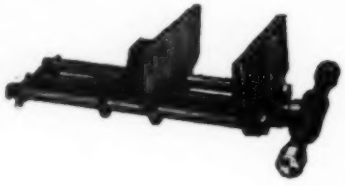
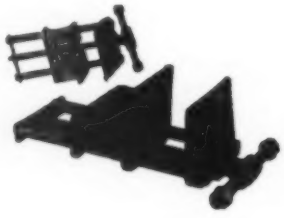
65 years of engineering and manufacturing skill plus rigid inspection and strict quality control make possible an UNCONDITIONAL GUARANTEE — giving you sureness of choice from vises that combine high quality semi-steel castings with skilled and accurate machining.

quick action vise

Semi-steel castings accurately machined, tubular steel handle, cold rolled screw with intercepted threads operates in a half nut, slight twist-of-the-wrist disengages, engages screw quickly — freeing or locking work in place.



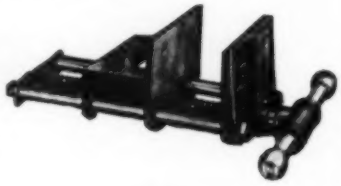
18A dual purpose vise



Semi-steel castings machined to close tolerances, continuous buttress thread screw cut from heavy cold rolled stock, floating nut gives rapid action with smoother screw action, adjustable stop built into front jaw — this new development combines speed of Rapid Action with smooth screw action of a Continuous Screw Vise.

solid nut, continuous screw vise

Semi-steel castings, cold rolled screw, solid nut, cold rolled side bars — all machined to close tolerances — tubular steel, aluminum or wood handle — similar model available with adjustable steel handle and stop in front jaw.



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N. H. INDUSTRIAL EDUCATION ASSOCIATION

The New Hampshire Industrial Education Association this year reports seven area meetings in different parts of the state. Under the direction of Earl Little, director of vocational education, small groups have been set up to revise a study guide to suit the various areas of industrial arts. The chairmen and areas of the groups are as follows:

Everett Blake, White Mountain Area — general wood; Herman Caswell, Lakes Region — general metals; Bernard Smith, Seacoast Region — electricity; Floyd Bailey, Dartmouth-Sunapee Area — ceramics, plastics, and textiles. In the Merrimack Valley, Clarence Gay, Concord — Auto; Ray Pelletier, Manchester — graphic arts; Delma Langille, Nashua — leathercraft, art metal, and jewelry. In the Monadnock Region (chairman to be named) — mechanical drawing.

Plans are now under way for the Association's Fourth Annual Project Fair which is held in conjunction with the Ford Motor Company and the State Department of Education. The fair this year will be held May 23 and 24 at Concord's new Rundlett Junior High School. It is expected that over 600 projects will be exhibited in the areas of arts and crafts, auto mechanics, radio, machine shop, general metal, printing, sheet metal, general shop, building trades, woodworking, silk screening, electricity, plastics, cabinetmaking, cosmetology, drafting, and cooking and baking.

Chairmen of the various fair committees are: general chairman, Robert Turner; local arrangements, Carl Bartlett, Herbert Boutelle, and Monty Kalloch; judging, Frank Tisdale; publicity, John Nay; program, George Jones; door prizes, Charles Morgan; Ford IAA, Charles Beard; informational guidance, Andy Moynihan.

Officers currently serving the New Hampshire Industrial Education Association are: Robert Turner, president; John Nay, vice-president; and Fred Sienko, secretary-treasurer. — *John Nay, publicity.*

LOS ANGELES COUNTY MEETING

The Los Angeles County Industrial Education Association held its February 28 meeting at Jordan Junior High School, Burbank, Calif.

John Maguire, assistant professor and director of the Industrial Design Program at U.C.L.A., presented a very interesting program entitled "Design in Industrial Education." More than 300 members and guests were in attendance, including representatives of several of the nearby colleges who brought displays to inform prospective students about their respective industrial education programs.

Several members of the Pasadena City School District presented interesting "quickies" (teaching aids) before the evening's program. — *R. Servis, publicity.*

(Continued on page 6A)

HERE'S PROOF OF PERFORMANCE:

"My eight Clausing 6328 Lathes are the finest lathes for instructional use I have ever seen. Their safety features, ruggedness and ease of operation make them tops in their field. You offer so many more features than any other lathe that I would vote for a Clausing every time."

Harold Burgan, Spokane, Washington

CLAUSING 6300-series 12¾" LATHES

are "TOPS for safety... ruggedness... ease of operation"

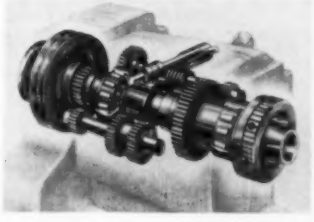
Harold Burgan's statement above is typical. Instructors everywhere report Clausing Lathes set the standard for safety, rugged construction, ease of operation and Value! Here are a few reasons why:

Headstock, apron and quick-change are *totally enclosed* . . . inquiring fingers can't get into these danger zones, nor can dirt or chips . . . all gears and shafts travel in a bath of oil. All controls . . . including those for back gear engagement . . . are located outside machine. Spindle nose is tapered Key-lock . . . eliminates danger of chuck run-off on braking or reversing.

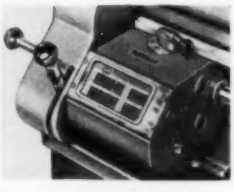
Flame hardened bed ways for longer wear are standard equipment *at no extra cost.* Spindle is forged steel, turns on Timken "Zero-Precision" tapered roller bearings. Apron and quick-change gears are protected by safety devices . . . lead screw has easy-to-replace shear pin.

Drive is underneath . . . no exposed belts or pulleys. Has heavy-duty ball bearing countershaft. Two V-belts drive the spindle . . . belts are outboard for easy replacement.

Get the facts and compare with any other lathe in its class . . . feature for feature, dollar for dollar. We know you'll agree Clausing 6300-series are today's outstanding values . . . *the* lathes for *your* shop. Write for illustrated literature today.



Enclosed construction of headstock provides greater rigidity, safety . . . longer service life. All gears, shafts and bearings travel in a pumped bath of oil.



Quick-change box, too, is totally enclosed and gears and shafts turn in bath of oil . . . another important safety and long-service-life feature exclusive with Clausing in lathes of its class.

CONDENSED SPECIFICATIONS

Swing over bed	12¾"
Between centers	21½", 33½", 47"
Hole thru spindle	1⅜"
Thread range	54 selections, 4 to 224 Standard right or left
Motor recommended	1 or 1½ HP, 1 or 2 speed

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CLAUSING DIVISION, ATLAS PRESS COMPANY

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ASSOCIATION NEWS

(Continued from page 4A)

CALIFORNIA INDUSTRIAL EDUCATION ASSOCIATION

The twenty-ninth annual convention of the California Industrial Education Association held in Long Beach, March 14–15, stressed significant satellites, speakers, sessions and exhibits, which, blended together, produced one of the most outstanding meetings in the association's history. In excess of twenty-four hundred persons attended.

The theme of the convention, "Imagineering in Industrial Education," was amplified by distinguished speakers in general sessions and outstanding teachers in the sectional meetings. These speakers repeated the challenge that while imagineering in industrial education is based on the lessons of the past and the trends of today, its quality will be determined by imagineering and creativity.

Highlighting the convention were addresses by outstanding speakers representing the fields of education, government, business, and industry. Representatives of education included: Douglas A. Newcomb, superintendent of Long Beach Unified School District; Dr. Cecil Hardesty, superintendent of schools, San Diego County; Dr. Henry M. Gunn, superintendent of schools, Palo Alto City Unified School District; Dr. James J. Hunter, executive dean, San Diego State College; P. Victor Peterson, president, Long Beach State College; Dr. A. R. Hibbs, professor, California Institute of Technology; and Samuel L. Fick, chief of the California Bureau of Industrial Education.

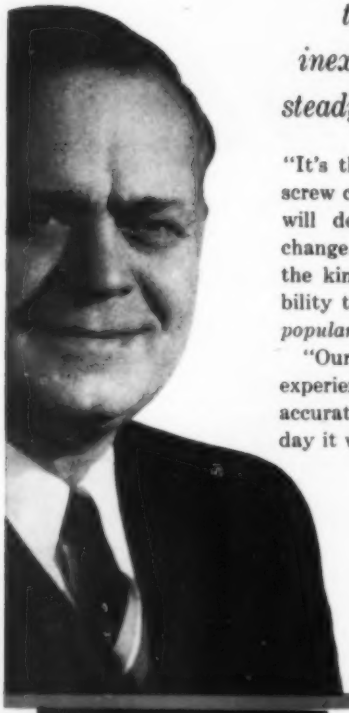
Representing business and industry were such nationally known speakers as Harley Iams, associate director of research, Hughes Aircraft Company, and E. A. Quade, manager of basic research, International Business Machine Company.

Over a quarter of a million dollars worth of school equipment and supplies were attractively displayed in one hundred and fourteen booths by commercial exhibitors. In addition, nine chapters of CIEA entered attractive booths emphasizing creative ideas in teaching aids.

A significant indication of the growing strength and solidarity of industrial education teachers in California is that over eight hundred teachers sat down at the banquet to hear the closing statements of President J. Lyman Goldsmith and the opening remarks of President-elect Jack Reynolds. By this year of 1958, California Industrial Education Association has reached points of achievement, at local, section and state levels which have not existed at the time of any previous convention. The program was "snappy;" no long speeches. With this in mind, the committee was fortunate in signing up the very popular and dynamic speaker Leslie L. Thomason, Director, Air Age Education, Cessna Aircraft Company, Wichita, Kans. Mr. Thomason has a national reputation as an after dinner speaker.

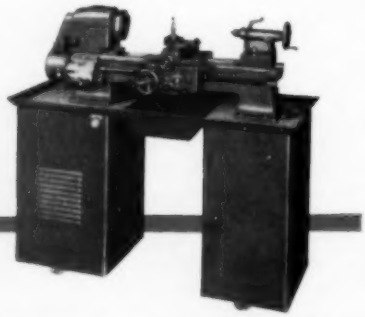
The success of the convention was largely responsible to the detailed planning of the convention committee headed by General Chairman, J. Everett Hollingsworth (dean, Business and Technology Division, Long Beach City College). The committee included Dr. Glenn D. Warrick, (supervisor, industrial arts, Long Beach City Schools), program chairman; Dr. Thomas Dean (head, I. A. Teacher Training, Long Beach State College), exhibits chairman; Ralph M. Rogers (supervisor, Trade and Industrial Education, Los Angeles City Schools), printing and publicity chairman; Jay F. Ackerman (vocational instructor, Long Beach City College), housing and meals chairman; Leonard Torres (instructor, Long Beach State College), and registration chairman; Arthur Steiner (instructor, Millikan High School, Long Beach.) — *Ralph M. Rogers.*

"*This* lathe is a work horse... *Teaching the intricate skills of lathe metalworking to a shop full of impetuous, inexperienced youngsters takes steady nerves and sturdy lathes.*



"It's the kind of job this Logan 11" screw cutting lathe is built for.... It will do *more* things *well*, with no change in bearing adjustment. This is the kind of versatility and dependability that spells *low upkeep* and *high popularity* with educators!

"Our shop instructors know from experience that this Logan will be as accurate, after years of use, as the day it was set up."



Look at a *Logan* before you leap

Logan 11" swing lathe with 1" collet capacity, 1⅜" spindle bore, 24" and 36" centers, and 16-speed V-belt drive.... The Logan line includes turret and screw cutting lathes from 9" swing and 17" between centers to 14" swing and 40" between centers. Also 8" shapers.

CATALOG ON REQUEST. *Phone your* LOGAN *dealer or drop a line to:*

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NEW OFFICERS ELECTED

The Massachusetts Industrial Education Society, during their annual meeting and banquet at Hotel Continental, Cambridge, Mass., elected the following officers: president, Arthur G. Sticklor, head, industrial-arts department, Natick High School, Natick; vice-president, Gerard Antonellis; secretary, William Howat; treasurer, Robert Irving; past-president, Leo Gittzus.

The business session was preceded by the annual banquet, a feature of which was the panel discussion, "Storage Facilities and Installations in Junior and Senior High Schools." Joseph Slyva was moderator of the panel that included Otto Salak, Malcolm Oliver, and Clement Calder.

Joseph Chicetti showed slides of storage facilities in several junior and senior high schools in the state, covering the phases of the discussion: machinery and equipment, material and supplies storage, and pupil projects and teaching aids storage.

W.I.A. & V.E.A. CELEBRATES SILVER ANNIVERSARY

The Westchester Industrial Arts and Vocational Education Association, one of the largest and most active associations in New York State, celebrated its Silver (25th) Anniversary on April 18, 1958, with a special function at their annual ladies night dinner-dance at the Village Inn in Port Chester, N. Y.

The executive committee who laid the plans consists of William Ploeser, president;

(Continued on page 22A)

STANLEY SHOP TALK

NEW ELECTRIC DRILLS

Heavy-duty—Recommended for school shops

The two models in this new 130 series that Stanley recommends for school use are the H133—¼" at 1100 rpm full load speed, and the H136 —⅜" at 500 rpm full load speed. These drills are full ball-bearing construction with lifetime lubrication and low temperature rise for cool operation. Trigger switch in non-slip pistol grip has locking pin at base of grip. 3-jawed geared chuck.

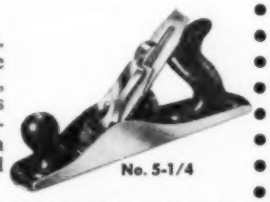
BLOCK PLANE

The Stanley "100 PLUS" No. 118. Here's an all steel, low angle plane that's really BOYPROOF. Only three pieces, and the locked-in cutter adjustment prevents thread stripping or lost parts.

No. 118

JUNIOR JACK PLANE

Stanley No. 5-1/4 Junior Jack. The ideal plane for boys at the junior high school level. Fast, clean cutting, easy to adjust, it's 11-1/2 inches of balanced performance with the usual high quality Stanley workmanship and materials.



No. 5-1/4

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The Yankee "100 PLUS" No. 41 – The mechanic's friend, this sturdy all metal tool is a handy shop tool. Bores small holes quickly with a one-hand drilling action. The drill point in use is locked in. Eight drills from 1/16" to 11/64" (by 64ths) are stored in the handle.

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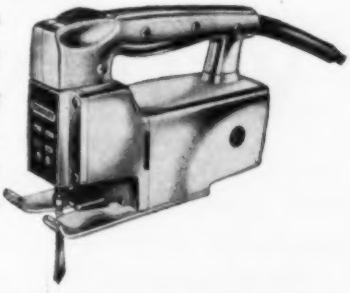

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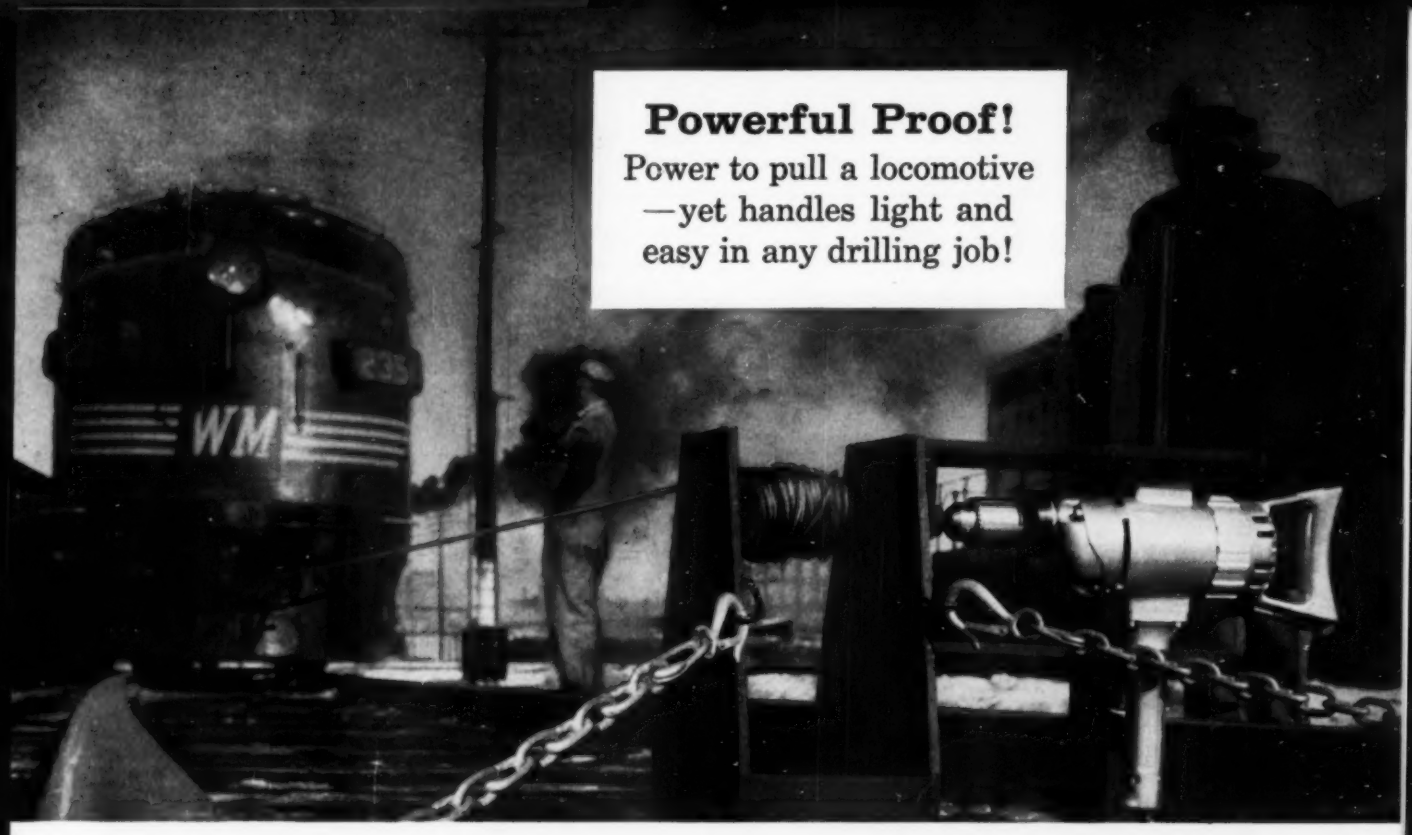

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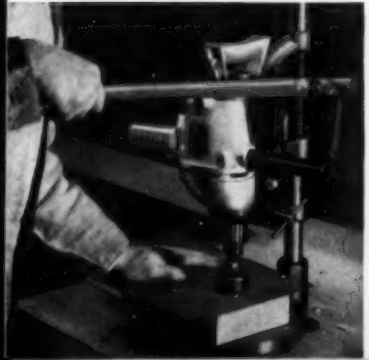

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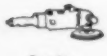
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Impact Wrenches

Saws

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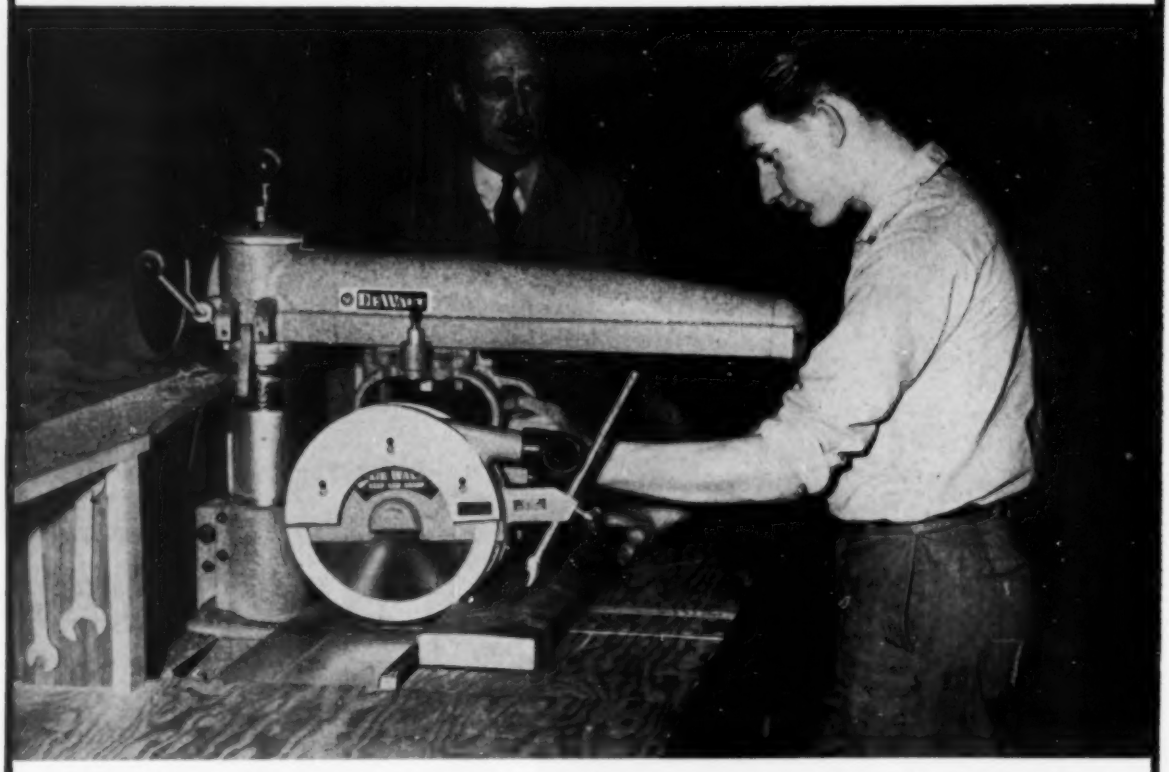
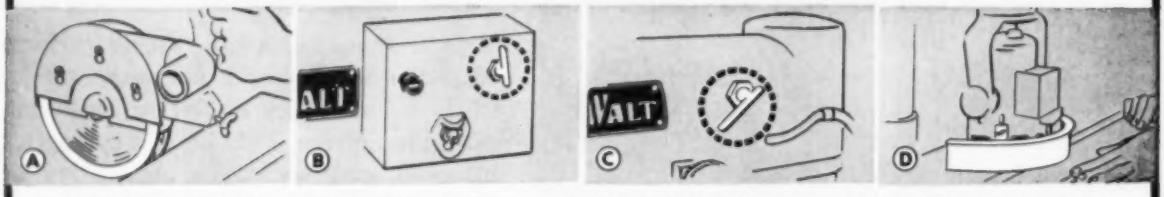


And De Walt® has the safest record in industry!



You need these exclusive operating safety features: **A**—Simpler, safer top-side cutting with exclusive safety guard. See your mark *and* your saw. **B**—Power brake stops saw in 4 seconds for *added* safety. **C**—Safety key switch prevents unauthorized use. **D**—De Walt becomes tilting arbor shaper with exclusive shaper guard—gives 50% more shapes per cutter. Combines 12 basic power tools. Builds into workbench, gives safer straight-line handling.

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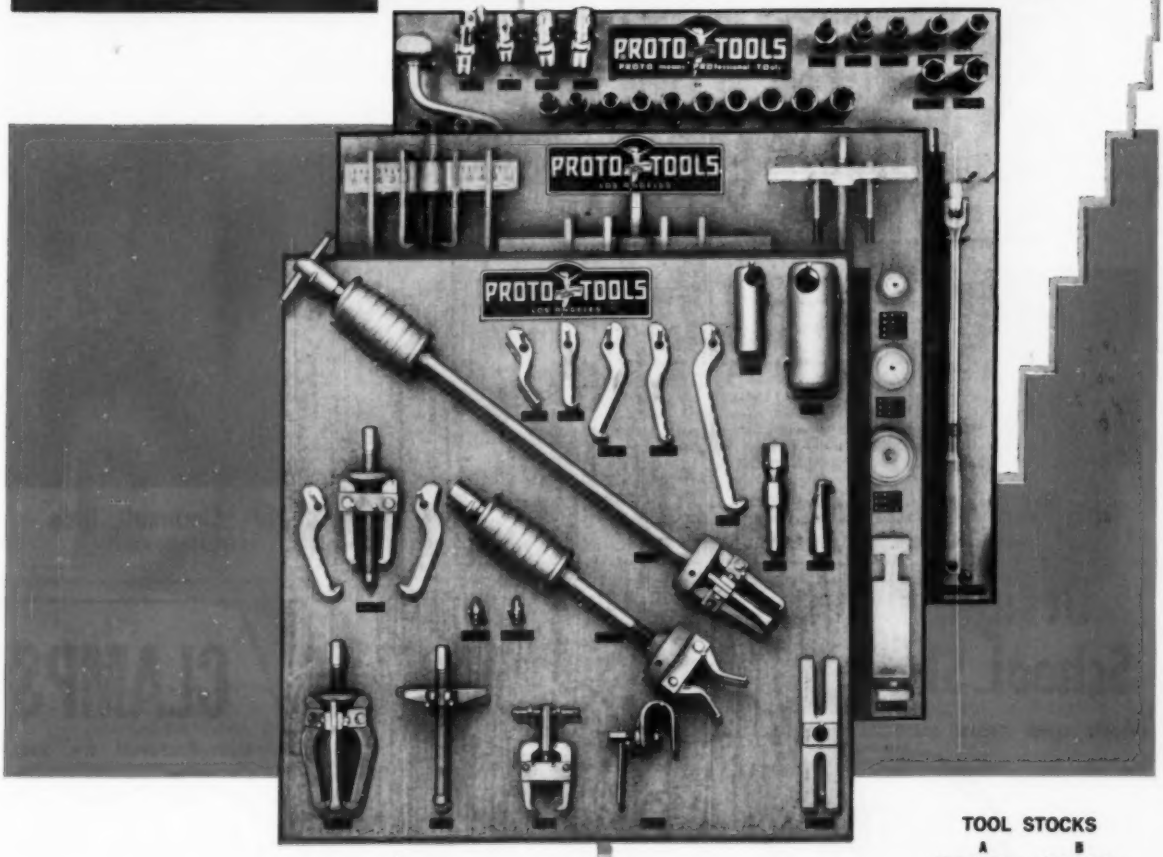

Now available are identified panels as complete, ready-to-install tool inventories. Standard in many schools, Proto tools are more convenient to stock and use on these new panels.

- Shadow-marking shows exact spot for tools . . . fast, accurate, visual inventory before dismissing classes.
- Uniform panels simplify tool classification, organization, and discussion. All panels 2′ x 2′.
- Add panels easily as broader needs develop.
- Tough finish and strong hardware withstand hard usage.
- Blank panels available – see Note.
- Retail value* of stock subject to special school discount. Ask your distributor.

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Students learning on Parks Planers benefit not only from the safe, easy, and accurate operation of these planers, but also from the practical experience of working on the same type of high-speed, precision built planers they will eventually use in their trade. The Parks No. 20, 20" Planer (at right) has a 4-knife cutter-head with a speed of 3600 R. P. M. and offers two feed speeds—20 and 40 F. P. M. or 40 and 80 F. P. M. Available with knife-grinding attachment at additional cost.

THE **PARKS** No. 20
20" Thickness PLANER
WITH KNIFE-GRINDING ATTACHMENT

THE **PARKS** HEAVY-DUTY
12" Thickness PLANER

At left is the Parks Heavy-Duty 12" x 4" Planer—a compact, sturdy thickness planer with feed speed of 16 F. P. M. at 4000 R. P. M. Will handle material as short as 6" and as thin as 1/16". Both planers are priced low enough for even the most modest shop budget. WRITE FOR COMPLETE DESCRIPTIVE LITERATURE.

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serve them best.

It's not just their ruggedness and accuracy alone, but their practical size and built in safety of operation that set them apart from ordinary tools for schools.

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Apron and Book Racks. Provides space for aprons, books, etc., of 12 students. Each compartment is 12 in. deep, 12 in. wide, 9 in. high.

All the storage units you need in HALLOWELL School Shop Furniture

Need racks for storing current supplies of lumber, pipe, bar stock, conduit? Or steel pegboard cabinets for safely storing tools? Or cabinets for holding student projects? Or wardrobe cabinets for apparel? We make standard units of HALLOWELL School Shop Furniture for all these storage requirements. And they cost much less than custom-designed equipment.

Write for Bulletin 2246 today. It gives detailed information about the complete line of functional HALLOWELL units for outfitting industrial arts and vocational shops. Hallowell Shop Equipment Division, STANDARD PRESSED STEEL CO., Jenkintown 74, Pa.

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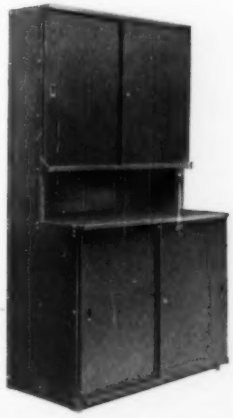
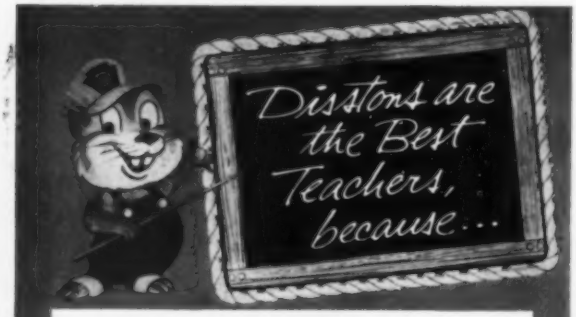


Stain and Finish Cabinets. All-steel for safe storage of flammable materials. The base has one adjustable shelf, the upper cabinet two. Both base and upper cabinet are equipped with smooth-operating sliding doors.



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SAWS HAVE **ALL** THE BEST SAW FEATURES

Show your students how to **select** as well as **use** a smooth-cutting, long-lasting hand saw. Teach them to look for these 6 features:

STRAIGHT BLADE. Make sure by sighting along blade edge from handle to tip. DISSTON saws are straight!

EVENLY SET TEETH. Sight down tooth edge from handle to tip—points should be in two straight lines. DISSTON saws are set evenly!

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CHOOSE DISSTON
hand saws with confidence. Rip saws 26", 5½ points per inch. Crosscut saws 16" to 26", choice of 7, 8, 9, 10, 11, 12 points per inch in most popular lengths.

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Sirs: Send me, without obligation, free wall chart which illustrates how to use and care for hand saws.

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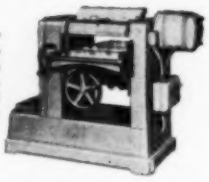

HAND JOINTER—compact and accessible. Built in 8" and 12" width. Table 6'2" long, maximum rabbet depth 9/16". Round, 3 knife safety type cylinder head, 3 HP 3600 RPM motor.

SHAPER—1" diameter spindle, with 4½" vertical adjustment, 36" x 26" table, spindle speed—8,500 RPM, floor space—34" x 37".

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As an instructor, you know the value of these tools to an apprentice. Point out these facts to graduating students—suggest this set as a career-boosting investment for students themselves—or as a gift from friends or parents.

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Industry's favorite Band Saws are right for teaching. Oliver Band Saws are made in 18", 30", 36", 38" sizes. They are easy to operate, and are built for rugged service. Notice these features of the Oliver 30-inch Band Saw:

- Upper wheel has automatic brake
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- High-speed ring-disk wheels run true at all speeds
- Self-locking table tilts 45° to right, 10° to left
- Efficient dust-collecting system
- Heavy one-piece frame keeps motor arbor permanently aligned

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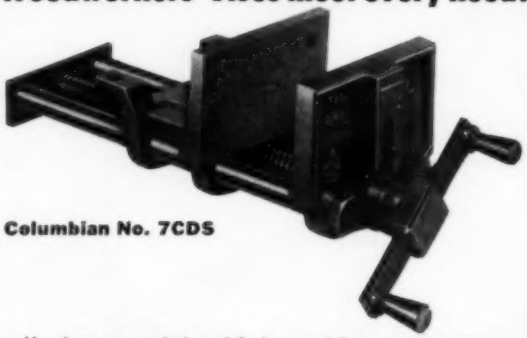

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You may select Plain or Dog Type front jaws. You may specify Hardwood, Tubular Steel or Adjustable Steel Handles. Write for Bulletin LL-3184.

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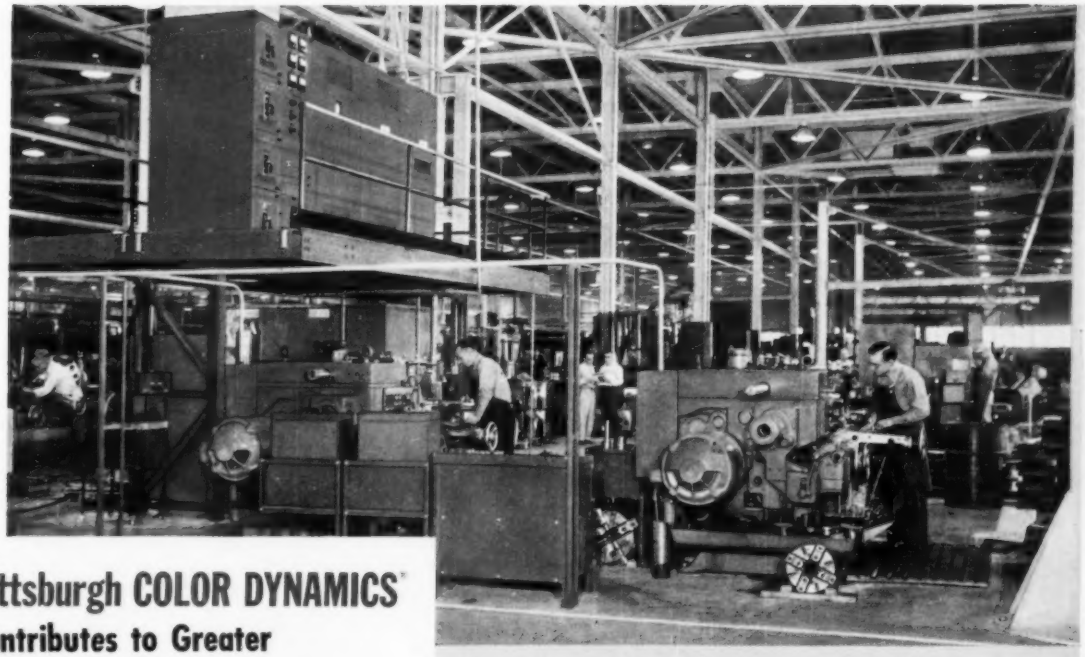


Skilled shopmen of tomorrow must know how to use this modern painting system to improve production, morale and safety

Pittsburgh COLOR DYNAMICS® Contributes to Greater Efficiency and Productivity

BLAW-KNOX

Color plays an increasingly important part in increasing productive efficiency by improving work areas. It is also enhancing the morale of workers and reducing the risk of time-loss accidents.

● **That's why vocational educators** often include the study of Pittsburgh COLOR DYNAMICS in their courses. They recognize that knowledge of this system of painting will be of great help to students in their future tasks.

● **Thus, tomorrow's shopmen** are being shown how the principles of COLOR DYNAMICS, applied to structures and machinery, can provide a more pleasing environment which aids workers in their tasks.

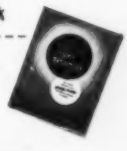
● **Shopmen in many plants** all over the country, such as the new Blaw-Knox factory at Mattoon, Illinois, are finding that COLOR DYNAMICS helps workers to see their jobs better by the functional use of focal and eye-rest colors on walls, ceilings and machinery. Morale-building colors promote cheerfulness and improve employee morale. Safety colors on mobile equipment and traffic lanes safeguard workers against accidents.

● **Equip your students** to be better shopmen tomorrow. Teach them the principles of COLOR DYNAMICS. Furthermore, give them a practical demonstration of these important benefits by using this painting method in the decoration of classrooms and equipment.

Get a FREE Color Plan for Your Classrooms

● Write today for a free booklet which explains how COLOR DYNAMICS can be applied in industry. Better still, we'll be glad to prepare a detailed color plan of your vocational classrooms and equipment without obligation. Call your Pittsburgh Plate Glass Company branch and have a representative see you. Or mail coupon at right.

Send for a Copy of this FREE Book



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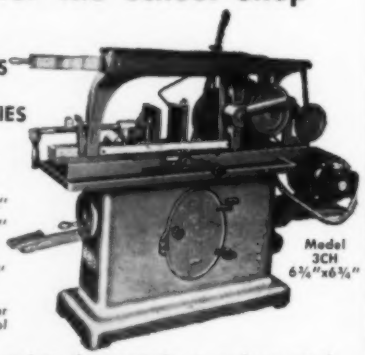
10 MODELS
5 CAPACITIES

4" x 4"
5" x 5"
6¾" x 6¾"
8½" x 8½"
and
10½" x 9"

A model for every school shop



Model 3CH 6¾"x6¾"

Give your students the opportunity to work on actual production equipment . . . the same as used in industry! Help them to learn right . . . and easily. Keller Power Hack Saws cut pipe squares and rounds fast and accurately. Rugged construction for tough student use. Low cost helps you stretch your equipment budget. Used in school shops everywhere.

Write today for New Catalog with complete details on all models with low prices.

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Power **HACK SAWS**

Builders of Power Hack Saws since 1931

WOOD SCREWS
MACHINE SCREWS & NUTS
TAPPING SCREWS
STOVE BOLTS

IN FASTENERS SOUTHERN IS

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DRIVE SCREWS
DOWEL SCREWS
HANGER BOLTS

Quality is an important element in your shop projects. Use Southern screws and bolts to help produce quality workmanship. There are no better fasteners made than USA-made Southern Screws. Available in leading Hardware and Building Supply Stores . . . Specify — insist on — Southern fasteners!

Southern SCREW COMPANY

SAW FILING

This ONE Machine

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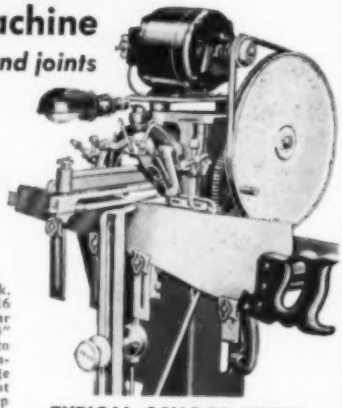

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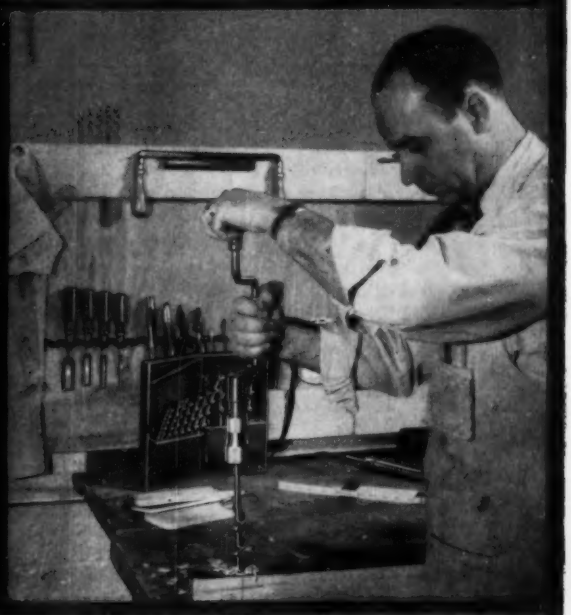

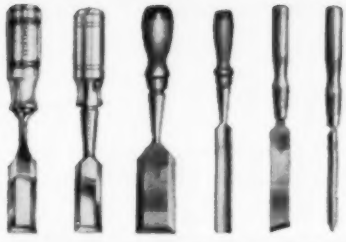

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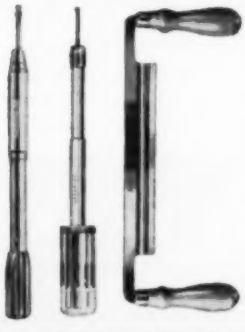

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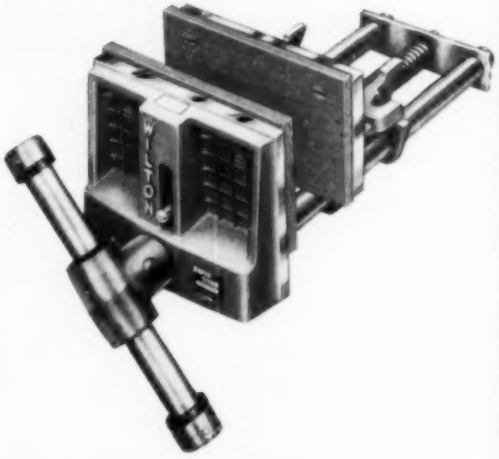

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Industrial Arts and Vocational Education
The Shop Teachers' Professional Magazine
MAY 1958

Discernible Trends in Industrial Arts for the Past Half Century

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A trend is something that points out a general tendency or inclination in a certain direction. When one examines the research of past years, certain identifiable practices can be pointed out — just when one practice seems to go out of the picture and a new one enters is difficult to say. In retrospect for the past half century in industrial arts new concepts have evolved emanating from various leaders in our field. The old adage that philosophy precedes practice by 25 to 50 years seems evident in our history. Nevertheless, men and events go together and it is impossible to separate the two.

Philosophy Precedes Practice

During the beginning of the twentieth century, a broader concept for the activities included in *shop work* was brought on the scene. Developing this idea were Gordon Bonser and Dean Russell of Teachers College. Irish[1] states that there was a "Call for diversity rather than a specialization of skill." This idea was in keeping with the understanding of the adolescent during that time. Another major factor influencing thinking of that period was the rapid development of industry in its various ramifications. It was felt that the broad areas of industry should be a part of our work instead of sampling a few specialized fields in hand work.

The movement brought about by C. A. Bennett, E. H. Harlacker, and others contained the thought to make the home life of the boy more meaningful through familiarizing him with materials and construction used in building the modern home. This idea gave rise to the household mechanics courses in later years. In fact, according to Irish,[2] an editorial written by Bennett in 1922 mentions the home mechanics course in Detroit as the "general shop idea." This was the first mention of the general shop as such. The name seemed to come later in the development of the shop since Harlacker is credited with the starting of the diversified course in shopwork in Eau Claire, Wis., in 1908.

The ideas underlining the early general shop development in this country seemed to evolve around three major aspects: (1) the development of diverse industries in the United States, (2) the genuine concern for meeting the needs for adolescence, and (3) making the home life more meaningful for the student.

Other Influential Factors: There was a growing belief substantiated in an article by S. Lewis Land[3] that employers were not particularly interested in the public schools developing skill. Other qualities seemed to be of paramount importance, such as honesty, self-reliance, and knowledge of the fundamental process.

Hall[4] said that school executives more and more came to accept the industrial arts concept and to recognize it as a phase of general education and teacher training institutions were more readily accepting the general shop concept for the training of industrial arts teachers. There was also a growing trend to make industrial arts contribute to the development of consumer values.

Definition and Objectives

Bonser's[5] often quoted definition is listed again because its influence has had tremendous effect in giving definiteness to industrial arts in its early years.

> . . . Industrial arts is a study of the changes made by man in the forms of materials to increase their values, and of the problems of life related to these changes.

In more recent years, there seems to be no unanimity of opinions as to a definition of industrial arts. However, one of the most inclusive definitions is given in the *Dictionary of Education* edited by Good[6] and it states that industrial arts is:

> . . . a phase of the educational program concerned with orienting individuals through

[1]Josie Clinton Irish, "Developmental Study of Comprehensive General Shop," p. 9. Unpublished Master's Thesis, Colorado Agricultural and Mechanical College, Greeley, Colo., 1949.

[2]*Ibid.*, pp. 16–17.

[3]S. Lewis Land, "What Industry Expects of the Public School," INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, Vol. 19 (Apr., 1925), p. 291.

[4]Robert O. Hall, "Evolution of and Trends in Industrial Arts Education in the Secondary School," p. 1. Unpublished Master's Thesis, Kent State University, Kent, Ohio, 1948.

[5]Frederick G. Bonser, and L. C. Mossman, *Industrial Arts in the Elementary Schools*, p. 5.

[6]Carter B. Good, Editor, *Dictionary of Education*, pp. 215–216 (New York: McGraw-Hill Book Company, 1945).

study and experience to the technical industrial side of society for the purpose of enabling them to deal more intelligently with consumer's goods, to be more efficient producers, to use leisure time more effectively and enjoyably, to have a greater appreciation of material culture, and to act more intelligently in regard to matters of health and safety, especially as effected by industry.

The earlier objectives of industrial arts were grouped around four main headings — avocational, exploratory, consumer knowledge, and handy man abilities. There has been a tendency to be more specific and to include more objectives. Irish[7] reports on specific objectives for the general shop in order of frequency as reported by 61 shop instructors in 1948 as follows:

1. Providing craft experiences suitable for hobby interests.
2. Reading and making working drawings for personal use.
3. Self-expression through planning and building useful projects with tools and materials of modern industry.
4. Adjusting and making minor repairs in an industry.
5. Exploring aptitudes and interests in industrial work.
6. Choosing wisely the industrial products that are needed in modern living.
7. Getting social experiences that will develop understanding and ability to work effectively with others.
8. An understanding of industry, its workers and processes.

The most recent publication in the field to have widespread circulation is the American Vocational Association's brochure[8] entitled "A Guide to Improving Instruction in Industrial Arts." The nine objectives are listed below:

1. *Interest in Industry.* To develop in each pupil an active interest in industrial life and in the methods and problems of production and exchange.
2. *Appreciation and Use.* To develop in each pupil the appreciation of good design and workmanship and the ability to select, care for, and use industrial products wisely.
3. *Self-Realization and Initiative.* To develop in each pupil the habits of self-reliance and resourcefulness in meeting practical situations.
4. *Co-operative Attitudes.* To develop in each pupil a readiness to assist others and to join happily in group undertakings.
5. *Health and Safety.* To develop in each pupil desirable attitudes and practices with respect to health and safety.
6. *Interest in Achievement.* To develop in each pupil a feeling of pride in his ability to do useful things and to develop worthy leisure-time interests.
7. *Orderly Performance.* To develop in each pupil the habit of an orderly, complete, and efficient performance of any task.
8. *Drawing and Design.* To develop in each pupil an understanding of drawings and the ability to express ideas by means of drawings.
9. *Shop Skills and Knowledge.* To develop in each pupil a measure of skill in the use of common tools and machines and an understanding of the problems involved in common types of construction and repair.

The 1953 AVA brochure, a sequel to earlier publications by the same organization, is hoped to merit continued acceptance and use in the field as have the previous works.

The Curriculum

At the turn of the century, subject matter areas in the manual training shop consisted mainly of woodworking and mechanical drawing. As the industrials arts concept replaced the manual-arts concept, there was a general decrease in the amount of work done with manual tools and an increase in the amount of work done with machines. In Stephens, Minnesota, J. H. Service in 1914, as reported by Irish[9] offered an opportunity for any interested boy to build anything within reason in his shop. Wood, metal, and electrical projects were constructed. Through the period of 1900–28, various individuals throughout the country began offering more and more opportunities for students to work in a variety of materials and to work in activities heretofore never dreamed possible.

Areas of Instruction: Some of the leading areas of instruction around 1924 were wood, drawing, leather, general metals, art metal, craft work, and electricity. There was a growing tendency to interpret and include various divisions such as sheet metal, bench metal, art metal, etc., within the general areas.

By 1925 the idea of the general shop was being accepted quite generally, and around 1930 many programs included woodwork, drafting, metalwork, electricity, auto mechanics, graphic arts, and blueprint reading.

Wells[10] in an article in 1947 said:

The trend is definitely toward the generalized program with much more emphasis being placed upon planning to include work in many materials, such as the various metals and alloys.

After World War II, a group of graduate students under the leadership of Dr. William E. Warner[11] suggested the areas of instruction to be much broader than in the past. They included construction, power, transportation, and communications. There is evidence that some teacher training institutions and industrial-arts programs on the high school level are incorporating some of these ideas.

The general instructional areas recommended by the AVA guide[12] in 1953 list the following for a comprehensive general shop:

1. Drawing and planning
2. Woodworking
3. Metalworking
4. Electricity and radio
5. Graphic arts
6. Transportation and power
7. Plastics
8. Leatherwork
9. Ceramics
10. Textiles
11. Home mechanics

The preceding list substantiates the trend to broaden the scope of the instructional program in industrial arts.

General Shop Organization

During the period of industrial arts development in the beginning of the twentieth century, several types of shops have emerged. The unit shop is the name applied to a shop activity wherein students experience one area of work. The general unit is a broader interpretation of the same area of work. The general shop which seems to be best suited for the smaller schools has a number of shop activities under the direction and supervision of one individual. This makes it possible for a student to work continuously on a project involving more than one activity until it is completed. The early household mechanics course was in effect the general shop in this sense.

Unit Shop Versus the General Shop: There has been a marked tendency for unit shops to be reorganized into general shops. Forsea, as reported by Irish,[13] conducted a survey in 14 states west of the Mississippi, learned that 66 shops had been organized from unit shops. Other research in our field indicates that same tendency. In fact, Johnson[14] relates that since the late '20's there has been a marked tendency

[7]Irish, *op. cit.*, pp. 45–46.

[8]American Vocational Association, "A Guide to Improving Instruction in Industrial Arts," *American Vocational Association*, A Revision of Standards of Attainment in Industrial Arts and Improving Instruction in Industrial Arts, p. 18 (Washington, D. C.: 1953).

[9]Irish, *op. cit.*, pp. 46–48.

[10]George K. Wells, "Education Confused," INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, Vol. 36 (Jan., 1947), p. 16.

[11]William E. Warner, *et al.*, "The New Industrial Arts Curriculum," p. 2. Unpublished Report, Ohio State University, Columbus, Ohio, 1947.

[12]American Vocational Association, *op. cit.*, p. 41.

[13]Irish, *op. cit.*, p. 29.

[14]Charles E. Johnson, "Certain Trends in Industrial Arts Shop Planning, 1930–1950," p. 17. Unpublished Master's Thesis, Kansas State Teachers College, Pittsburg, Kans., 1950.

for unit shops to be replaced by general shops.

Recent literature reveals that around 75 per cent of the teachers rotate the students within the general shop areas. Some report 60 hours spent in each area, or a total of six to nine weeks. The shop periods range from 50 to 60 minutes each. The classes are generally started by demonstrating a beginning job in each area and then dividing the classes into various sections. The average enrollment was found to be 24 pupils.

Planning the Industrial-Arts Shop

Various factors influence the planning of an industrial-arts shop. The most important single factor is a well-defined philosophy of education consistent with the purposes of general education, psychology of learning and under constant scrutiny or reappraisal. Other factors pointed out so ably by Johnson[15] are:

1. Whether the department already exists or whether a new one is being planned.
2. Location of the shop with reference to other activities of the school.
3. Present and future needs.
4. Availability of instructors that are able to carry on an extensive program of industrial arts.
5. Financial resources of the local community.
6. Objectives of industrial-arts education to be achieved.
7. Building codes both local and state.
8. Architectural style desired.
9. Safety precautions.

Principles of Shop Planning: Within recent years research studies have developed planning guides. One such guide by Raymond C. Doane[16] gives attention to educational instructional values, safety factors, psychological and social influences and economical considerations. These guides aid those responsible for developing school shops under sound principles. A more scientific approach to the problems of school shop planning has been noted. A variety of research studies has been conducted along this line and has aided immeasurably in the development of a more adequate program of industrial arts.

Physical Aspects of a General Shop: Some of the physical aspects relating to the general shop are here noted with statements of trends.

1. Location — On the main floor of the main school building (individual buildings are not considered as desirable as those that are part of the main building).
2. Rectangular, 1 to 1½ or 1 to 2, ceiling height 14 to 15 feet, room width about 60 feet, length 118 feet (trend away from 1 to 1 ratio and the irregular shops).
3. Partitions — Solid, 42 inches above the floor, then reinforced with glass for 4 feet or higher and then solid above that point. Space allotment approximately 100 square feet per pupil (trend is to increase the square feet per pupil. In 1930 recommended 50 square feet; in 1940, 100 square feet — not unusual to see 125 square feet per pupil).
4. Students — average size class around 24.
5. Lighting — minimum 30 foot-candles for shop and 50 foot-candles for drawing. (Tendency to eliminate windows and rely on artificial light.)
6. Utilities — gas, water, electricity air, drain and exhaust outlets where necessary. (trend to include air conditioning in shops).
7. Flooring — wood most practical, other types to suit activity (trend to include many other types of flooring, cork, rubber tile, asphalt tile, mastic tile).
8. Other aspects include recitation facilities, bulletin, chalkboard, project storage, shop library, and washing facilities.

Plan of Procedure: To eliminate oversights and to get objectivity in the problem of planning a general shop, Doane[17] developed an approach which offers a definite plan of action. His procedure is as follows:

1. Review general education objectives.
2. Determine industrial-arts objectives.
3. Determine industrial-arts offerings in terms of general education and industrial-arts objectives.
4. Develop industrial-arts instructional program in terms of general education and industrial-arts objectives.
5. Reinterpret objectives in terms of desired outcome.
6. Determine general plan of instruction.
7. Determine the type and number of students for each class.
8. Prepare courses of study.
9. Prepare detailed equipment list from courses of study.
10. Determine floor plan arrangement.

There has been a marked tendency in the past few years to utilize check lists

[15] *Ibid.*, pp. 6–7.
[16] Raymond C. Doane, "Shop Planning Guide for Industrial Arts," p. 12. Unpublished Master's Thesis, Stout Institute, Menomonie, Wis., 1950.
[17] Doane, *ibid.*, pp. 16–18.

Summary of Trends in Industrial Arts for the Past Half Century (1900–1950)

Trend	*Past*	*Present*
1. Philosophy	(NOTE: 25–50 years ahead) Variety of industrial understanding Meet needs of adolescents Making home life more meaningful Consumer education	(NOTE: Where is emphasis?) Broad areas of industrial activity Problems relating to daily living
2. Definition	*Bonser:* Industrial arts is a study of the changes made by man in the forms of materials to increase their values, and of the problems of life related to these changes	*Carter B. Good:* A phase of the educational program concerned with orienting individuals through study and experience to the technical industrial side of society for the purpose of enabling them to deal more intelligently with consumer's goods, to be more efficient producers, to use leisure time more effectively and enjoyably, to have a greater appreciation of material culture, and to act more intelligently in regard to matters of health and safety, especially as effected by industry
3. Objectives	Emphasis on hand skill Exploration Avocational Consumer knowledge Handyman abilities	1. Interest in industry 2. Appreciation and use 3. Self-realization and initiative 4. Co-operative attitude 5. Health and safety 6. Interest in achievement 7. Orderly performance 8. Drawing and design 9. Shop skills and knowledge
4. Curriculum	Woodworking Mechanical drawing	Drawing and planning Woodworking

which have been developed for shop planners.

Summary

At the turn of the century, the vocal leaders of industrial arts have pointed out the need for diversity, and through the years, first through the development of the home mechanics movement and the need for meeting the needs of adolescents, the industrial arts general shop was born. The shop with its variety of activities was generally accepted by educators as contributing to general education and meeting the needs of all students. It was a synthesizing of three ideas: (*a*) representing an industrial society through processes used by industry, (*b*) meeting the needs of young adolescents, (*c*) making home life more meaningful to each.

The physical setting of industrial arts has changed greatly from its early beginning when a classroom or basement was converted into a *shop*. The hand tools used during the turn of the century are a far cry to the modern flexible machines that are arranged so attractively on the floors of today's industrial-arts laboratory of industries.

Another trend evident in examining the literature in industrial arts is the contribution the research studies have made in the field of industrial arts delving into its various ramifications. The bibliography appended to this article attests to the work performed by this ever increasing important group. Some of these studies have developed scientific instruments to be used to help establish programs in accordance with well founded principles.

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Trend	*Past*	*Present*
		Metalworking Ceramics Textiles Electricity and radio Plastics Graphic arts Transportation and power Home mechanics
5. Pre-building stage	Some	Community co-operation Scientific Objective Planning guides Check sheets
6. Shop organization	Unit (one to two activities)	Comprehensive general shop (Work many areas)
7. Shop locations	Apart from or in basement	In a wing of the main building Ground floor
8. Shop size	Square, 1:1, irregular; 50 sq. ft. per pupil Ceiling 18 feet No color, drab	Rectangular 1:1½; 3:5 100 sq. ft. per pupil Ceilings 14–15 feet Color dynamics Noise control Visibility throughout
9. Shop layout	Machine area Workbench	Planning Machine area Assembly area Workbench Storage facilities Area tools
10. Shop equipment	Heavy Industrial	Light weight Single purpose Safer Portable *V* Belts Simple design Dust collectors
11. Safety	Lack of adequate guarding	Guards Lines painted over danger zones Grounding of machines Fire extinguishers Hoods — exhausts Nonslip material Booth for welding Heating and ventilating (ceiling)
12. Lighting	15–30 Ft.-candles at bench height	30–50 Ft.-candles at bench height Venetian blinds Single switch for each light Windows
13. Floors	Wood Concrete	Wood — general Concrete — not metals Resilient (in office, planning, art) Cork Rubber Mastic Asphalt tile
14. Utility outlets	Gas and electricity	Gas Water Electricity Compressed air Telephone Clock Dismissal bell Fire alarms
15. Heating units	Floor or wall	Overhead
16. Plumbing	School lavatory	Drinking fountain Washing facilities Toilet or one nearby

Johnson, Charles E., "Certain Trends in Industrial Arts Shop Planning 1930–1950." Unpublished Master's Thesis, Kansas State Teachers College, Pittsburg, Kans., 1950.

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Trend	*Past*	*Present*
17. Planning area.	None	Drawing facilities Shop library Reference and planning materials Projector facilities Demonstration facilities Instructor's desk and materials Glass enclosed
18. Display	None or very little	Located in planning area Main corridors (Recessed in walls) In each activity
19. Workbench	Single type	Multiple
20. Tool procedure	Tool crib	Area tool panels
21. Finishing room	Separate	Part of shop proper enclosed

The Role of Art in Industrial Arts

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Americans are forced by practical needs to be connoisseurs of industrial art. One purpose of industrial-arts education is to help all citizens develop useful abilities to evaluate practical art without too much concern for how it relates to modern dribble paintings or art abstractions.

In the rush to mount the design bandwagon as a means of promoting aesthetic sensitivity teachers have occasionally lost sight of their goals. The fact that art objects are winning prizes in industrial-arts project competitions offers practical evidence of this. Though the line of demarcation between the fine and applied arts is anything but a clear-cut one, industrial-arts teachers should have little difficulty in discriminating between objects such as those in Figures 1 and 2 which clearly belong in one field or the other.

The growing emphasis on teaching problem solving has caused some to look upon individual project design as the answer in industrial arts to the need for promoting creativeness and for providing experience in problem solving. This is an easy but inadequate solution. The experimental outlook and opportunities to use initiative must pervade the entire program, not just the first few days of designing projects. There is great need to help youngsters employ their creative talents in experimenting with tools and materials to provide applications of principles of chemistry, economics, mathematics, physics, psychology, and sociology. They further need to solve design and technical problems

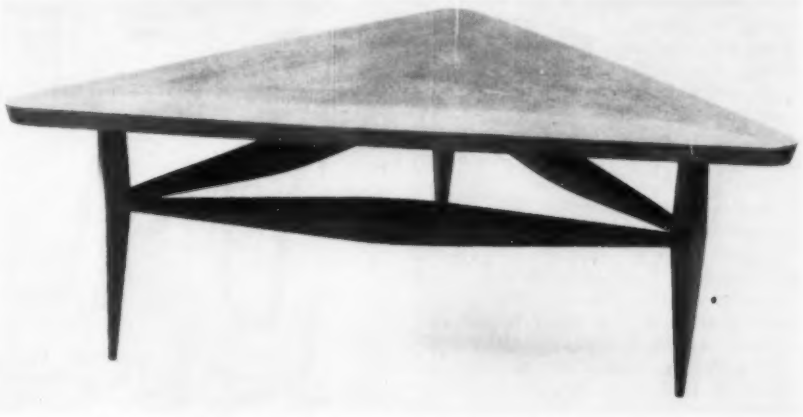


Fig. 2. Coffee table made by Fritz Cope, 17 years of age, Berkeley, Calif., High School
— Photograph, courtesy of 1957 Ford Industrial Arts Awards, Ford Motor Company

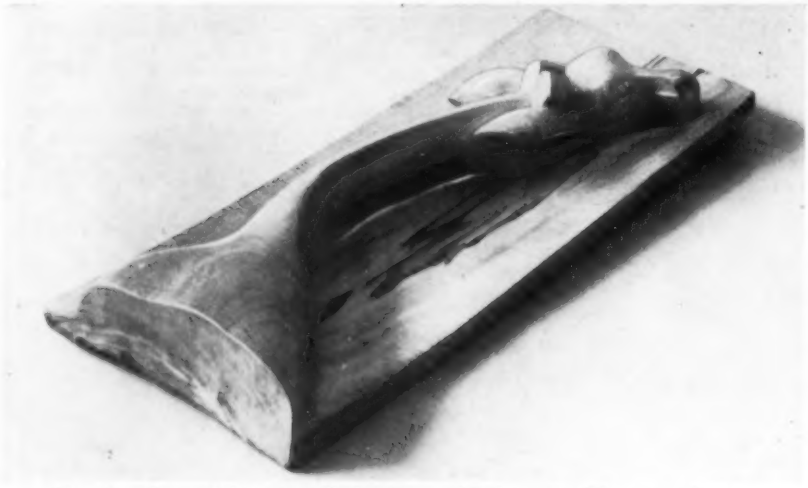


Fig. 1. Carved door handle by Howard Tahquette, 20 years of age, Cherokee Indian School, Cherokee, No. Car.
— Photograph, courtesy of 1957 Ford Industrial Arts Awards, Ford Motor Company

similar to those faced by industry. Industrial arts must serve first these needs.

If industrial-arts students are encouraged to devote time to objects like the one in Figure 1, their opportunities to achieve some important outcomes will be aborted. They will learn a kind of project design and tool and material information that little relates to industrial processes, procedures, and products. Students in industrial arts should primarily be concerned with the relationship of design to industrial tooling, production, and consumption, with the design problems related to quickly and efficiently reproducing objects of the type created in the art class, and with the technical problems of molding, casting, machining, pressing, assembling, or finishing these objects. They may also have the opportunity to present their problems to the class, assembled as an industrial board of directors, so the class can evaluate the merits of individual proposals and then organize to mass produce a common project by industrial methods.

Through this approach students experience practical situations which can acquaint them with the broad content of industrial arts. There *is* a need for an integration of art and industrial arts. There is an *equal* need for integration of elements of the natural and social sciences. In the process, however, industrial-arts content must remain the central, dominant theme.

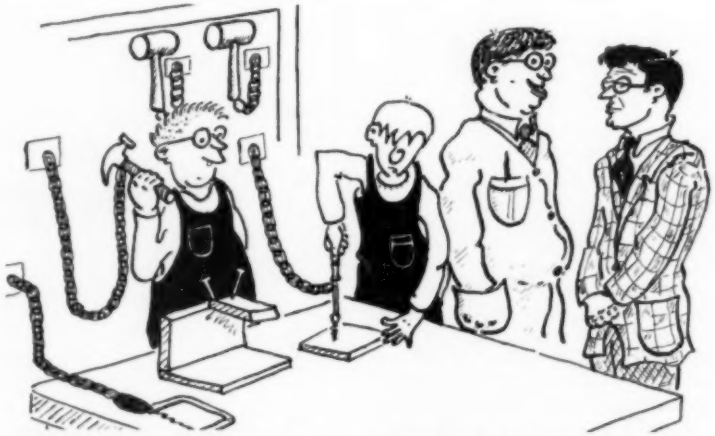
Modified copying is one of many appropriate techniques through which industrial-arts instructors may teach practical design sensitivity without stifling individual expression and without wandering afield. Students should be encouraged to visualize alternate design possibilities and to modify existing designs.* They need not be creative designers from scratch. Their goal here is to gain insights into procedures used by successful designers and into design principles.

As a hedge against misinterpretation, it should be clear that the opportunity should exist for the rare individual with native talent to express himself at the earliest opportunity. Similarly, the opportunity should exist for the advanced student to design from scratch. However, the beginner will have greater chance for success through some method akin to modified copying. Some may never go beyond this stage. This needs to be recognized, and it should not be inferred that copying is a naughty word in industrial arts. In our culture most will use exact duplicates of mass-produced products; be they food, clothing, shelter, or transportation.

Industrial arts holds no apriori right on developing aesthetic appreciations. Our forte is rightly in helping pupils to recognize design adequacy, to visualize design modifications, and to judge between available designs. Few of our pupils will become designers of industrial products. Perhaps even fewer will become art critics. In home workshop activities major efforts will be devoted to modifying existing designs to individual taste or functional requirements. The average citizen does not design the products he consumes, but he is called upon daily to judge them and to use them in *original* ways.

Industrial arts needs to take advantage of every opportunity to provide pupil activities which promote creativeness. However, the experiences also should lead to the achievement of the goals of industrial-arts education. In our field, activities employing the tools, materials, processes, and techniques of industry provide practical applications of the cognitive learning of other fields and provide opportunities for problem solving and creative expression as employed in industry. Industrial arts must concern itself with providing industry-oriented activities. This is its real mission. If effort is directed to fulfilling this general education need, there will be no reason to aimlessly wander about snatching fragments of related disciplines in an attempt to derive a justifiable program.

*On the other hand, if a student wishes to copy an object that is completely satisfactory to him, as evidenced by his intelligent evaluation of it in terms of his need, his abilities, and available time, materials, and facilities, then let him go on to the important business at hand. He has not passed his last opportunity to be creative in industrial arts, *he is just approaching the most fertile area* so far as we are concerned. "If this be treason, make the most of it!"



"Now that you mention it, our tool loss has been rather slight."
— William S. Hanks, State University of New York Teachers College, Oswego, N. Y.

A Course of Study in Ranching*

JOHN W. MAURICE
Principal
High School
Eckley, Colo
and
BENJAMIN J. NOVAK
Vice-Principal, Frankford High School, Philadelphia; Lecturer in Vocational Education, Temple University; Lecturer in Guidance, Rutgers University

Vocational agriculture is not different from other types of instruction; it too, must be adapted to local needs. A program which is quite effective in one community may be entirely unsuited to another district even a comparatively short distance away. Schools offering so practical a subject as agriculture cannot achieve success unless they continually work closely with the farm enterprises nearby.

In keeping with this point of view, a survey was made of agriculture in Gunnison County, Colo. The results of such a study it was felt would be useful in improving the vocational agriculture course at the Gunnison County High School.

The geographic and climatic features of Gunnison County have considerable bearing upon the nature of its agricultural activity. The average altitude is 7680 feet, and the frost-free growing season encourages the planting of grains and row crops. Freight and express service is limited to motor truck. The result of this is the restriction of the short growing season truck crops to local consumption.

The vast public grazing lands and native hay meadows encourage range livestock production enterprises. The ranches are located on the bottom land of the Upper Gunnison River and its tributaries. The livestock is pastured on the public domain and on the Gunnison National Forest reserve from late in May until early in October. During the remainder of the year the cattle are wintered on ranches and fed hay harvested from the native hay meadows.

*Based upon the master's report "A Course of Study in Vocational Agriculture for the Gunnison County High School" by John W. Maurice, Colorado A. & M. College.

Survey of Gunnison Ranches*

The survey included ranches owned or operated by Gunnison County ranchers who had children of three categories: (1) those taking the full-time course; (2) those who were planning to enter; and (3) those who had already graduated. The sample included 21 ranches, comprising about 30 per cent of the total in the area served by the school. The 21 ranchers were interviewed and the information was secured on: (1) physical characteristics of the ranch; (2) livestock and crop production enterprises; (3) farm mechanics enterprises; (4) recommended units of instruction.

The ranches varied considerably in size, the range being between 120 and 4000 acres. The average acreage was 894.

Farming Enterprises

Less than one per cent of all the land was cultivated. Thirty-five per cent was in productive meadow hay, and the remainder (about 64 per cent) was in pasture.

Only five of the ranchers raised cultivated crops, most of which consisted of small grains and alfalfa, with a small acreage in potatoes. The yield of oats and barley was good, indicating that small grain production might profitably be extended as a source of concentrate for feeding calves to be weaned, and brood cows. In the Gunnison area, however, especially in the heavily wooded creek bottoms, blackbirds are heavily destructive of grain. Thirteen ranchers planted a vegetable garden, the size of which averaged .17 acre.

Fifty-three per cent of the land was irrigated. Creeks supplied constantly by melting snow in the high range run through or by most of the ranches. This abundant water supply makes it possible to irrigate practically all of the bottom land.

The instruction which the ranchers considered to be most essential in crop production is shown in Table 1.

TABLE 1. Instruction in Crop Production Considered Important by 21 Ranchers of Gunnison County High School Area.

Units	*No. of Ranchers*
1. Keeping meadows productive	20
2. Pasture and range rotation	19
3. Eradication of poisonous and noxious weeds	17
4. Mineral deficiencies in hay and pasture grown on irrigated land	14
5. Seedbed preparation	14
6. Planting, cultivation, and irrigation of grains	12
7. Variety selection of grains	11
8. Irrigation of meadows (efficiency of)	6

The table shows a great interest in maintaining the productivity of meadows. The average yield per acre of hay on the ranches surveyed was only 1.4 tons. The factors contributing to the low yield include: altitude, wet areas, rough section, and faulty irrigation.

In 1946 a soil conservation district was established in the ranching area east of the town of Gunnison. An analysis of the local hay indicated a deficiency in the minerals necessary for normal animal growth. The soil lacked sufficient air and organic matter. The correction of these deficiencies requires the introduction of a long-time program of treatment.

Livestock Enterprises

Seventeen of the 21 ranchers operated beef cattle ranches, stocked with an average of 185 head of breeding animals, and 76 young. Of the remaining four ranchers, two had an average of 1010 head of sheep each, and two operated dairy ranches. All of the ranches

had dairy cows and horses for their own use, and 13 had poultry for the same purpose.

The calf crop of the beef cattle average 79.3 per cent. Only 73.8 per cent on the average of the calves dropped, survived to a marketable age. These low yields indicate the need for instruction in approved practices.

The animal diseases and parasites reported by the 21 ranches as being most commonly found are: black leg, lice, hemorrhagic Septicaemia, and Bang's disease. The lice are controlled by dipping, while vaccination is the treatment for the other diseases.

All of the 17 cattlemen reported a planned time and place for marketing their crop of yearling calves. Seven of the cattlemen have no marketing procedure to eliminate their nonproducing cattle.

The instruction in animal production considered of greatest importance by the 21 ranchers is indicated in Table 2.

TABLE 2. Instruction in Animal Production Considered Important by 21 Ranchers of the Gunnison County High School Area.

Units and Jobs	*No. of Ranchers*
1. Selection of breeding stock	21
2. Approved breeding practices	21
3. Feed, care, management of breeding herd	20
4. Feeds and feeding practices	20
5. Castrate, dehorn, brand calves	18
6. Breaking and training riding horses	10
7. Trim cattle feet	10

Many other activities were suggested by the ranchers. Among the items named were: vaccination, livestock judging, conditioning steers for market, increasing calf crop, and butchering.

Farm Management and Leadership Training

In connection with farm management, the ranchers voted heavily for instruction relating to (1) farm records and accounts; (2) farm credit; and (3) marketing.

With respect to leadership training, the opinion was strong that there should be instruction in how to conduct meetings, and in public speaking. The course of study in agriculture as it now exists includes activities in the "Future Farmers of America organization." The youth identified with this group have to conduct public meetings, lead group discussions, and practice public speaking.

The Proposed Course of Study

The proposed course of study in vocational agriculture includes the recommendations of the local ranchers, and suggests the "cross-sectional plan" of organization. It would consist of supervised farming projects, flexible enough to meet individual needs. Units in similar areas would be included each year, but with increasing complexity as the program progresses.

In planning and administering a cross-sectional, project centered program, the following should be considered:

1. Introducing the supervised farming program to the new students in vocational agriculture.
2. Determining kind and size of production project.
3. Selecting the production project.
4. Estimating profit and loss on various livestock projects.
5. Determining the cash and feed requirements of project selected.
6. Financing, purchasing, and marketing production projects.
7. Writing project plans.
8. Keeping records.
9. Work out project agreements.
10. Analyzing completed supervised farming projects.
11. Making plans to continue and enlarge supervised farming.
12. Determining worthwhile improvement projects.
13. Determining worthwhile supplementary farm practices.

It is recommended that a seasonal sequence be followed in the presentation of units, the instruction being given at the time or just prior to the need for its use.

It is proposed that shop skills be taught to the group, with the individual being allowed to progress as rapidly as his ability permits. After the basic skills of farm mechanics units have been acquired by the student, he can repair or construct appliances needed for his supervised farming program or for the home farm.

Suggested Essential Units of Instruction**

A. Crop Production

1. Meadow hay production (including keeping meadows productive, mineral deficiencies of hay grown in irrigated meadows, and seed bed preparation).
2. Pasture and range management (including pasture and range rotation, and eradication of poisonous weeds).
3. Small grain production [barley, oats], including seed bed preparation, variety selection, and planting, cultivation, and irrigating.
4. Alfalfa production.
5. Potato production.

B. Livestock Production

1. Beef production (including (*a*) selection of breeding stock, (*b*) feed, care, and management of breeding herd, approved breeding pastures, (*c*) preventing and controlling diseases and parasites, (*d*) castrating, dehorning, branding and vaccinating.
2. Sheep production including (*a*) selection of breeding stock, (*b*) feed, care, and management of breeding herd, (*c*) controlling diseases and parasites.
3. Milk production.
4. Poultry production.
5. Horse and mule management.
6. Feeds and feeding practices.

C. Farm Management

1. Farm records and accounts.
2. Farm credit.
3. Marketing.

D. Leadership

The Future Farmers of America organization teaches rural leadership and co-operative activities. It is now considered to be an integral part of the all-day program. Activities considered important by the ranchers, and which can be included in the F. F. A. Program are:

1. Conducting meetings.
2. Learning parliamentary procedure.
3. Participation in public speaking activities and contests.

The success in actual practice of the proposed course of study should be studied.

Comparatively little information has thus far been published on vocational agriculture instruction devoted mainly to ranching. It would be helpful to have much more research of all descriptions in this area.

**See *Agricultural Education Magazine*, February, 1949, for units in farm mechanics.

Paneled walls are gaining in popularity for plywood makes them more available in new and old homes. The warm beauty of such walls has always been admired but previously was considered out of the reach of many.

Installing has also been made easy with products offered in suitable sheets for those who do their own work. To retain the wood's beauty it should be finished with a thinned coat of fresh, white shellac. A second shellac coat, when the first is dry, will increase the eye appeal and durability.

To refinish the panels, sand the wood smooth and brush it clean. The natural attractiveness of wood comes through if the thinned, pure shellac is applied to the surface. The shellac will dry quickly and the panel will then be ready for at least another shellac application.

If more detail is desired on finishing a free booklet will be mailed to those who contact the *Shellac Information Bureau, 51 Pine Street, New York 5, N. Y.* Individual questions will also be answered.

Vocational-Technical and Industrial Arts Education

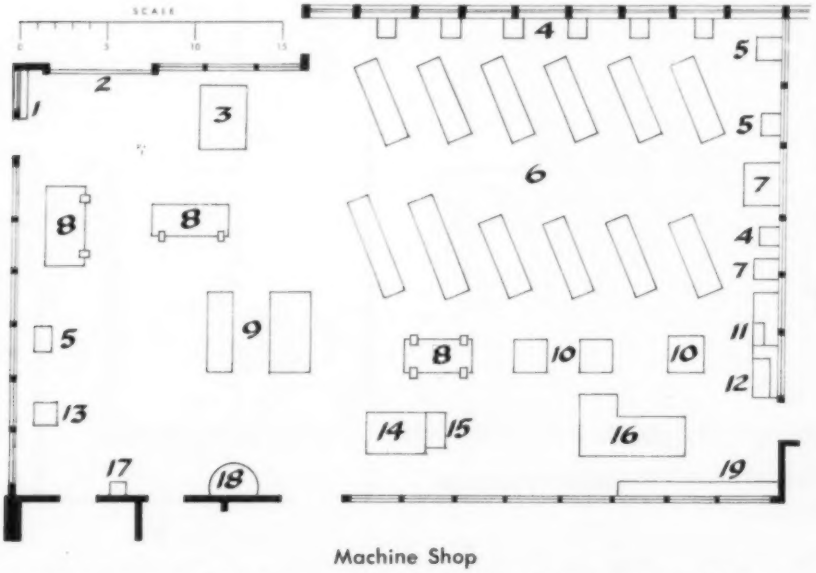
FRANK E. SUPPLEE
Director, Shamokin Area Joint Schools
Shamokin, Pa.

Modern facilities for a flexible program in vocational-technical and practical arts education were made possible through the enactment of laws by the Pennsylvania State Legislature, P. L. 1217, 1946. The act of the general assembly known as the "State Public School Building Authority" permits a school district to create a local school building authority for the purpose of constructing, furnishing, and equipping a public school wherein the State shares in all costs approved.

The Shamokin area joint board of education, believing in the future industrial growth of its community, initiated a building program to include vocational-technical and industrial arts shops for the training of youth and adults of the area. School administrators co-ordinated the planning to give functional value to the utilization of the finished school plant.

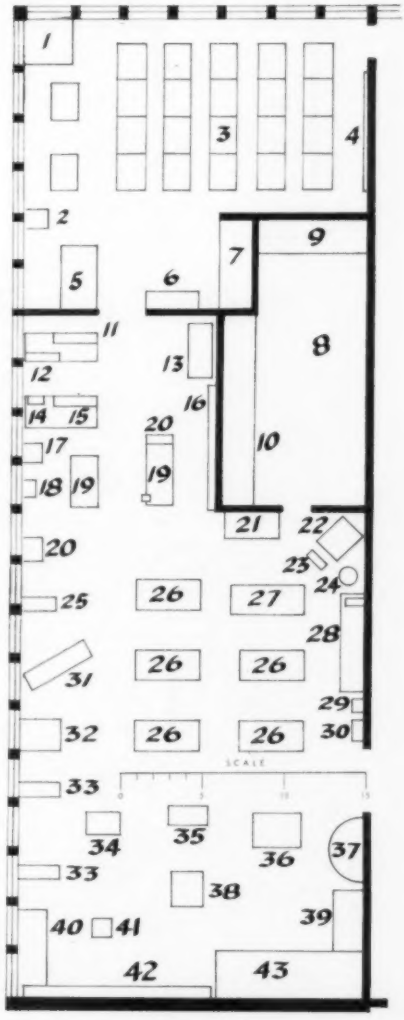
Teacher committees made scale models of shop layouts, showing machine positions, power line routing and air and gas line stations.

The area co-ordinator of vocational and practical arts education from the Pennsylvania State University consulted constantly with administrators, teachers, and architects contributing time and money-saving suggestions in the selection and the location of project and



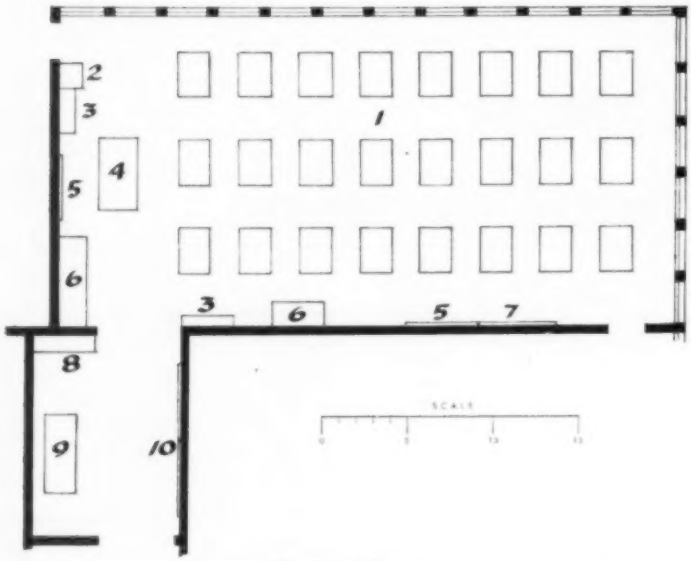
Machine Shop

1. Coat rack; 2. overhead; 3. drawing table; 4. tables; 5. grinder; 6. lathes; 7. drill press; 8. bench; 9. shapers; 10. milling machines; 11. buffer; 12. tool grinder; 13. heat-treating furnace; 14. instructor's desk; 15. cabinet; 16. planer; 17. fountain; 18. wash sink; 19. lockers



Industrial Arts

1. Chimney; 2. cabinet; 3. drawing tables; 4. chalkboard; 5. instructor's desk; 6. library; 7. storage; 8. storage room; 9. finishing; 10. project bins; 11. lathe; 12. brake; 13. foot shears; 14. buffer; 15. lathe; 16. tool panel; 17. drill press; 18. grinder; 19. bench; 20. slip roll; 21. foundry; 22. forge; 23. anvil; 24. furnace; 25. metal shaper; 26. benches; 27. steel table; 28. soldering and welding; 29. fountain; 30. welding tanks; 31. wood lathe; 32. sander; 33. scroll saws; 34. band saw; 35. jointer; 36. planer; 37. wash sink; 38. circular saw; 39. glue table; 40. bench; 41. shaper; 42. tool panel; 43. wood rack



Drafting Room

1. Drafting tables; 2. air brush; 3. bookcase; 4. instructor's desk; 5. bulletin board; 6. storage; 7. chalkboard; 8. shelves; 9. dri-print machine; 10. coat hangers

material storage rooms, tool rooms, theory rooms, lighting, dock height loading and unloading platforms and the selection of such permanent installations as an auto lift, paint spray booth, and dust collecting system.

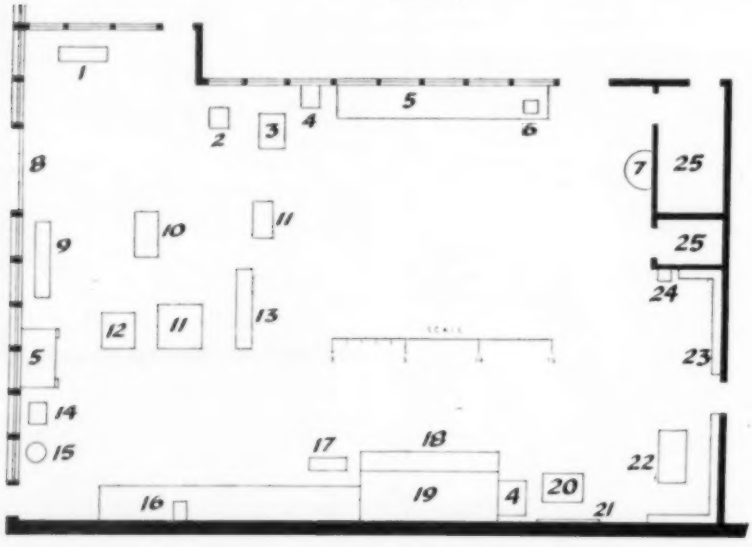
The state director for vocational and practical arts education, whose final approval of the shop area is required, gave a critical *over-all look* at our planning from time to time. Starting from the original project application he must be satisfied as to needs, both present and future. The size of shops with respect to projected student load is his concern; flexibility of shop layout to meet emergencies that may change shop offerings overnight. The state director is concerned with the relation of the program to the size of the community and the kind of industry in and near the community.

The board of education, in its application to the state to set up a public school building authority, must prove its financial stability and show needs for the new school facilities proposed in the application. In establishing the need for a more functional physical plant for vocational and practical arts education in the Shamokin area it was necessary to review the growth and achievements of the program from its inception.

The program for vocational education was started in 1941 through an appeal from the citizens and the press of the community. The area's major industry, anthracite coal, was fast declining, unemployment rolls increasing. Defense plants in nearby cities of the state were in great need of skilled labor. The area had thousands of men for labor but few were skilled.

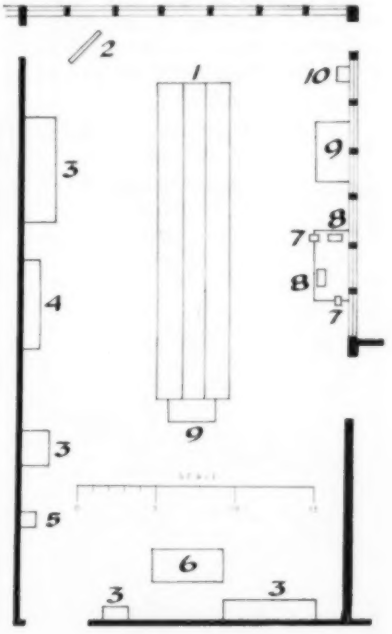
Through the co-operative efforts of school superintendents in the coal producing area of Northumberland County, a council was formed for the purpose of administering a vocational training program. Every available industry that had machine tools co-operated in setting up training shifts that ran 24 hours a day. School shops were set up in basements and in unused rooms in elementary buildings.

In 1945 the Shamokin city schools established a full-time day program of vocational-industrial education. The school had a fine program of industrial



Carpentry Shop

1. Lathe; 2. mortiser; 3. shaper; 4. cabinet; 5. bench; 6. drill press; 7. wash sink; 8. overhead door; 9. belt sander; 10. band saw; 11. planer; 12. circular saw; 13. jointer; 14. disk sander; 15. drum sander; 16. radial saw; 17. miter saw; 18. wood shorts rack; 19. chip and dust collector; 20. drawing table; 21. clamp rack; 22. instructor's desk; 23. lockers; 24. fountain; 25. lavatory



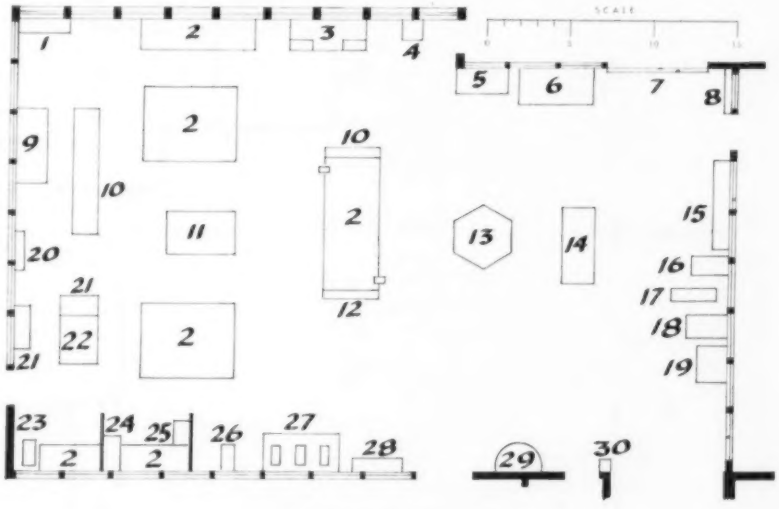
Radio-TV Shop

1. Worktable and test bench; 2. circuit panel; 3. cabinet; 4. tool panel; 5. fountain; 6. instructor's desk; 7. vise; 8. grinder; 9. bench; 10. drill

arts as a start. An old factory building was bought and remodeled, much of the work being done by the students. In 1946 the training program expanded to meet the needs of the returning veterans. Again our shops were too small. Our program for adults offered trade training in auto-mechanics, bricklaying, carpentry, electricity, machine shop, painting and paperhanging, plumbing, radio repair, sheet metal and welding, and upholstering. Our program in the day school offered auto mechanics, carpentry, electricity, machine shop, radio repair, and sheet metal and welding.

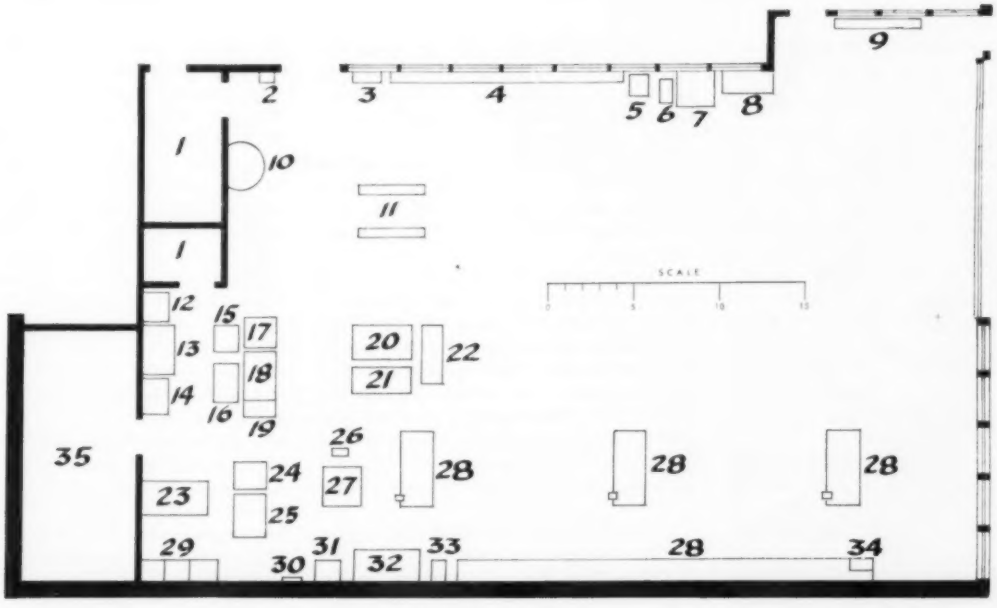
Again shops had to be established in basements and elementary buildings not suitable for such use. In the early 1950's several small industries came into our area. In-plant and short term training programs for these new industries were sponsored and operated by the Shamokin city schools through the department of vocational industrial education. Such courses as Diesel-engine maintenance and the theory of Diesel power were conducted on the job in the railroad shops. A new shoe factory required a three month training program in shoe making before starting production. This, again, was on-the-job training using their own foremen as teachers. The training job was sponsored by the school and administered through the vocational-industrial education department. A new cabinet factory required training in drafting and design as well as cabinetmaking. Vocational carpentry students in the day program with three years of related drawing filled their request in key positions. Students trained in electricity and electronics are interviewed before graduation for job placement by industrial representatives.

The needle trades industries of our



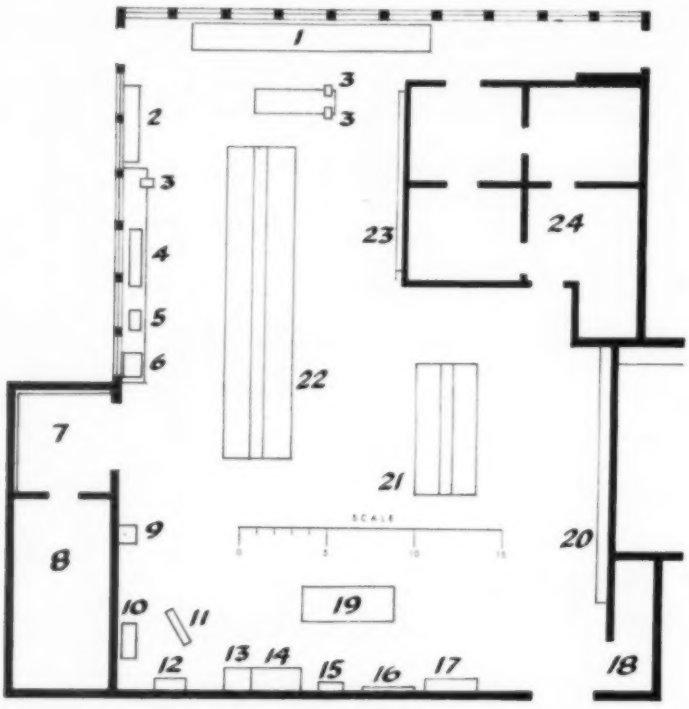
Sheet-Metal Shop

1. Cane metal rack; 2. workbench; 3. grinders; 4. drill press; 5. paper rack; 6. drawing table; 7. overhead door; 8. coat rack; 9. project storage; 10. brake; 11. foot shears; 12. slip roll; 13. sheet-metal machine; 14. circle cutter and seamer; 15. tool cabinet; 16. wire case; 17. power hack saw; 18. nibbler; 19. paint cabinet; 20. books; 21. cabinet; 22. instructor's desk; 23. acetylene; 24. heliarc; 25. arc; 26. spot welder; 27. soldering bench; 28. lathe; 29. wash sink; 30. fountain



Automotive Shop

1. Lavatory; 2. fountain; 3. battery charger; 4. lockers; 5. arc welder; 6. acetylene welder; 7. welding table; 8. compressor; 9. coat rack; 10. wash sink; 11. lift; 12. motor analyzer; 13. generator and regulator tester; 14. distributor machine; 15. experimental motor; 16. motor stand; 17. valve refacer; 18. honing machine; 19. brake lining riveter; 20. hydraulic press; 21. parts washer; 22. bay lift; 23. instructor's desk; 24. clutch rebuilder; 25. brake drum lathe; 26. brush wheel; 27. radial drill press; 28. workbench; 29. cabinets; 30. main switch; 31. grinder; 32. lathe; 33. drill press; 34. spark plug tester; 35. toolroom and storage



Electrical Shop

1. Worktable; 2. motor storage; 3. vise; 4. lathe; 5. grinder; 6. drill press; 7. tool panels; 8. storage; 9. fountain; 10. generator; 11. d.c. panel board; 12. d.c. rectifier; 13. oven; 14. cabinet; 15. main switch; 16. bulletin board; 17. transformer; 18. clothes; 19. instructor's desk; 20. a.c. motor control panel; 21. d.c. and large motor testing; 22. motor winding and worktable; 23. wiring panel; 24. knock-down house for rough wiring

community experienced new growth and came to the school asking for a training program for power sewing machine operators.

A shop was set up like a small industry; production of 200 to 500 shirts or pajamas are routed through the various machine operations, from pattern layout and cutting to ironing, folding, using job and bundle tickets en route. Two nine-hour-a-week sessions the year round keep the industry supplied with new help. Co-operative training for day school seniors in machine shop, auto mechanics, and sheet metal places the student in industry for his school shop time under special agreement and supervision.

In 1954 formal application was made to the State to form a local Public School Building Authority for the purpose of building a greatly needed addition to the high school. The Annex, as it is called, included the gymnasium, band room, homemaking suite, administration offices as well as the shop area for Vocational Technical and Industrial Arts.

In the spring of 1955 ground was broken for the erection of the new school plant. Construction was completed by fall of 1956. The shops moved in during November with an invigorating experience of a new superintendent, a dedication ceremony, and an evaluation survey of the high school.

This required new and revised courses of study, with job sheets, information sheets, trade analysis charts, student progress charts, revised inventory records, annual budget list for instructional materials.

The greatest satisfaction is to be found in student pride and behavior in the use of our new shops. Student trips to industrial plants take on a new meaning. The praise that industrial representatives give us when visiting our shops to interview seniors give teachers and administrators a deep sense of appreciation to a community for the support and faith in our educational efforts.

Auto Mechanics Shop

The students do practical jobs such as: complete engine overhaul, reline and adjust brakes, clutch assembly, transmission and differential repair. The students also learn to test, install, and repair the complete electrical systems of automobiles. Testing and motor tuning with full mobile equipment is part of the course. Acetylene and electric arc welding is taught; valves, bushings and brake drum turning is done with special equipment. Front end wheel alignment equipment is used for that phase of training. Fifty minutes daily is given to combustion engine theory for all types of internal combustion engines, theory is taught on models of latest transmissions. Small motor and farm equipment is repaired. Engine lathe, drill press and bench work is fundamental instruction for the future auto mechanic.

Sheet Metal Fabrication

The offering of sheet metal fabrication in the shop program is founded on the industrial survey of the area which shows numerous small shops locally and larger steel industries in nearby communities. Air conditioning installation and steel cabinet construction calls for shop training in the skills of layout, forming, and all types of welding. The sheet metal student is given geometric layout pattern drafting and is required to take geometry as a part of his mathematics. Metal spinning is a unit of instruction in this course. A paint spraying booth of modern design is a unit of special equipment for this shop.

Welding is given special attention in this course of study. The equipment includes a stationary spot welder and a portable one, acetylene equipment, electric arc and electric and argon gas equipment for light metals.

Machine Shop

The machinist, the tool maker, the die maker, and the machine designer are key craftsmen to production of all manufactured goods. This craft should continue to be basic in vocational-industrial training programs over the nation. Tools, machines, and materials are most important in this shop. Their lateness of design and condition are important. It is also true that in this craft the beginning training in skill and respect for exactness is of utmost value. Right habit formation from the simple chiseling and filing to a line for a beginner will assure later increased attention to tolerance expected in industrial work. A clean shop, clean machines, a well-organized tool room, clean charts, are contagious good habit forming incentives. Project work in this shop endeavors to embrace small tools and jigs as well as large pieces to be machined for assembly requiring parts welded and layout table use. Repair work from other shops is good training experience in this shop. Free hand sketching of parts to be rebuilt are tested in design and imagination.

Carpentry Shop

Modern trend in design and new materials in the building trades require our school training program in carpentry

to be alert to current procedures in construction, form making, and methods in machining of new materials.

Conducted tours to building sites of homes and larger construction is a part of the course of study. Visual aids obtained through the local union of carpenters and joiners give understanding to the many phases of construction work that the finished carpenter is an important part. Current trade magazines such as the *American Builder* and the *Practical Builder* bring the latest construction methods and material to our class. These aids are especially valuable to adult classes. Special attention is given to the student's progress in architectural drawing. In this shop safe work habits are a must. Daily is the reminder *A safe worker is a good worker*. Estimating is covered with the seniors acting as contractors on small building construction.

Electrical Shop

A laboratory completely equipped with the necessary machines and apparatus is used for instruction in this department. Considerable experience is gained through electrical repairs and installations made throughout the school plant. It is recognized that strict adherence to a course of study is of great importance in training the future electrician and technician. Theory is taught as a part of the trade practice and at the time the theory applies to the job. Work must meet underwriters' code regulations and specifications. Occupational information and job opportunities on the vast field of electrical work becomes a part of the instruction, that the electrical instructor only has the contacts and background to give the student the true facts.

Field trips to power plants, telephone exchanges and home building sites give the student a *look-see* at their future part in industry. Visual aids in film strips, movies and charts are necessary aids to the instruction. Safety is an everyday watchword in training of the electrical worker.

Radio and Television Repair

In the field of basic electricity, radio and television repair and testing, the instruction is basic electronics. The course becomes a highly specialized one. The student is taught a.c. and d.c. testing, vacuum tubes, power supplies, transmitters, frequency modulation, circuit building, circuit analysis. Electrical measurements and components of the electronic devices. Test equipment is the major concern in this shop. The equipment must be kept up to date. The repair cost to testing equipment is a shop budget item. Close noninterfering lighting is necessary with one or more magnifying lens holders for close work. Acoustical isolation booths are used for some testing. Shop theory is taught on the job. A good reference library is needed along with the Sams, RCA, Sylvania, Recter manuals. Shop mathematics pertaining to radio and television repair and building of test equipment must be taught on the job. Schematic drawing and the reading of commercial schematics are a part of shop instruction.

A boy taking an interest in this work and having scholarship ability has one of the best opportunities in industry today.

Drawing – Related and General

Recognizing that drawing in its wide diversity is the language of graphic interpretation used by industry, our course of study in drawing is general in its introductory period and becomes specialized in the area of related trade drawing.

Our students begin their drawing experience in the seventh grade and if they become vocational students they continue through the twelfth grade. The course content from seventh grade to twelfth grade includes the following units of instruction: (1) introduction to the language of graphic arts, (2) basic understanding and use of tools, (3) control and stability in lettering, proportions, and composition of symbols, (4) careful use of models as an aid, (5) lectures, recitations, and blackboard work, (6) visual aids, (7) sketching, filling in broken machine parts, (8) redesigning of established structural sections, (9) simple map making, (10) air brush work, (11) transit and level work, (12) pattern drafting, (13) blueprint reading, handbooks and their use as a source of information, (14) required plate drawings from French & Svensen, French Engineering, Twens and Edstrom, (15) freehand sketching, (16) blueprint reading and print production.

The seventh, eighth, and ninth grades have one fifty-minute period a week which is given to drawing. In the tenth, eleventh, and twelfth grades, two periods a week are given to drawing. Technical students receive shop drawing in addition. In the training of the technician, detail becomes important, information regarding every detail of structure and machinery becomes a part of the pictorial representation. The handbook is the draftsman's bible. Next to mathematics, drawing and designing are his most important subjects.

The learning of the graphic language of industry can be exciting. There can be group satisfaction as well as the individual pride in achievement.

Industrial Arts – 7th to 9th

The industrial-arts shop is located in the same area as the vocational industrial shops. Although the philosophies and aims of the two phases of education and training are different, there are similarities that lead to a more smoothly run program for both when they are in close proximity to one another.

In our program of vocational and practical arts education we believe the strength and worth of the vocational-technical industrial courses are dependent to no small degree to the strength and worth of its industrial-arts offerings.

Our centrally located visual-aids room permits industrial-arts groups to view many of the general type industrial films. Our staff room and technical library in this area is used by both trade and industrial and industrial-arts teachers. It is a common meeting ground, and it is surprising the helpful exchange of ideas and opinions that take place.

The general shop for the 7th and 8th grades provide such areas of instruction as general metal, general wood, forging, foundry, and plastics; each area has its own tool cabinets and material racks. There is a central finishing room and it includes the project storage bins. The planning room and shop library is a part of the shop, so constructed that the instructor can control both areas. Although project making is basically the medium for instruction it is not stressed to the point of sacrificing the general knowledge needed in technology for today's living. To teach the appreciation and understanding of the world of work, the identification of special skills, abilities, and aptitudes, the developing of consumer judgment and the stimulation for originality requires procedures in methods and approach more varied than in any other teaching situation.

Each student receives two fifty-minute periods per week in industrial-arts shop in the 7th and 8th grades. Shop management is extremely important in the student's beginning experience. Student responsibility for tool orderliness, equipment care, and shop cleanliness are forerunners to safe shop practice.

The 9th grade industrial-arts shop is devoted to the broad field of electricity and electronics but keeping in mind the philosophy of the industrial-arts education in exploration through practical experiences, demonstrations, visual aids and laboratory experiments as well as simple projects in beginning electricity and basic radio.

To preserve a map, paste it to cheesecloth and brush a thinned coat of pure, white shellac over it. The shellac can also be used to paste the map to the cheesecloth. — *Shellac Information Bureau.*

Industrial Arts and Vocational Education

JOHN J. METZ, Editor

SOME THINGS TO DO IN MAY

THE first thing to remember is that May is the month for writing requisitions. Probably the best suggestion is — "be sure to attend your state and national industrial arts and vocational education conventions." At these meetings you have an opportunity to meet many teachers who are experienced requisition writers. They will be glad to discuss your problems with you.

You will also have an opportunity to visit the exhibits where you can investigate hand and power tools, and new products and materials, and see how they would fit into your situation. The men who are in charge of the exhibits will be happy to meet you and give you a demonstration.

Writing requisitions, however, requires more than merely knowing what is wanted. The writer must also know how to describe articles clearly so others know what he wants.

The names mentioned in the advertising section of this magazine can be relied upon to furnish excellent goods.

Another thing to remember is to warn your students of the dangers which they may meet during the summer. Vacation time should be a happy time for young and old. The thousands of accidents could be avoided that happen annually during vacation days on the highways, while boat riding, swimming, diving, climbing trees and electric light poles, or visiting buildings that are under construction, walking carelessly along country roads, and playing all kinds of games on thoroughfares forgetting all about the wagons, buggies, trucks, and automobiles that may be using the streets and highways for legitimate purposes.

Then there are the acts of vandalism that run up costs to fabulous heights and may bring the youngsters into trouble with the law.

Another thing that should be mentioned to the youth starting out on their vacation is the danger of eating poisonous fruits and berries or touching poisonous plants, drinking polluted water.

Prepare your students so they will have a happy and joyous vacation.

DRIVING SAFELY

THOMAS N. BOATE, manager of the accident prevention department of the Association of Casualty and Surety Companies, recently remarked that a great many automobile drivers are still being taught how to drive by a relative or a close friend.

This method passes along to the new driver the mistakes of the generations of drivers who have preceded him. The best way of improving the abilities of the huge group of licensed motorists (80,000,000 at present) lies in educating drivers while they are young.

During the summer months there are many opportunities for teachers who want to give driving instruction to the students in their own schools, to acquire the specialized training required to give such courses. Many teacher education institutions offer such courses, or they can get this training from the Association of Casualty and Surety Companies' own teacher-training program.

He reminds drivers that they must not forget the basic rules of safe driving.

ARE YOU GOING TO SUMMER SCHOOL?

IF YOU wish to attend a teacher education institution this summer, the following list may help you in making your choice.

ILLINOIS

Bradley University, Peoria, Ill.

First term, June 16 to July 19.
Second term, July 21 to August 23.

COLORADO

Colorado State University, formerly Colorado A. & M. College, Fort Collins, Colo.

Four-week terms: June 16 to July 11; and July 14 to August 8.

NEW YORK

New York University, Washington Square, New York 3, N. Y.

Intersession, June 3 to June 27.
Summer session, July 1 to August 8.
Postsession, August 11 to September 5.

OREGON

Oregon State College, Corvallis, Ore.

Summer session, June 23 to August 15.

PENNSYLVANIA

The Pennsylvania State University, University Park, Pa.

Intersession, June 9 to June 27.
Main session, June 30 to August 9.
Postsession, August 11 to August 29.

NEW YORK

State University of New York Teachers College, Oswego, N. Y.

Intersession, June 16 to June 27.
Summer session, June 30 to August 8.
Postsession, August 11 to August 22.

WISCONSIN

Stout State College, Menomonie, Wis.

Summer session, June 23 to August 1.
Postsession, August 4 to August 15.

MINNESOTA

University of Minnesota, Minneapolis, Minn.

First term, June 16 to July 19.
Second term, July 21 to August 23.

MICHIGAN

Wayne State University, Detroit 2, Mich.

Beginning June 23, for six, eight, or ten weeks. Write to Industrial Education Department, College of Education, Wayne State University, Detroit, Mich.

Automotive Instruction in General Education

E. ROBERT RUDIGER
Assistant Professor of Education
Stout State College
Menomonie, Wis.

Within the past year, nearly 52 million drivers operated more than 34 million passenger automobiles on the streets and highways of our nation. During this same period automobile transportation accounted for more than 541 billion miles of passenger travel. The fact that approximately 75 per cent of all automobile trips are for business and shopping purposes, has changed this medium of transportation from a luxury to a necessity. With this being the case, the selection, operation, and care of the automobile has become an increasingly important activity among our population.

Since one of the major purposes of general education in our high schools is to promote the total, well-rounded development of every individual in terms of his own life needs, then there appears to be a need for our high schools to offer some form of automotive instruction which will help prepare our youth to become intelligent and safe consumers of automotive products.

While it may be safely assumed that nearly every high school youth will eventually become an automobile owner or operator, relatively few high school administrators have undertaken the task of furnishing automotive instruction in their programs. Evidence of this fact is revealed by recent statistics which show that only three out of every one hundred of the high school pupils in our nation were enrolled in some form of nonvocational automotive instruction during the past year.

Furthermore, while it may be assumed that the educational needs of youth concerning automotive products are similar in all communities, there is little uniformity in the automotive instruction being offered by our high schools at the present time. Some schools offer instruction dealing with minor adjustment and care of the car, while some offer training dealing with major automobile repairs, and still others teach only driving skills and attitudes.

What then should our high schools teach concerning automobiles? Should the atuomobile course deal solely with driver education? Automobile care? Automobile selection? Or should a comprehensive course be offered including all three of these basic activities? In other words, what type of automotive instruction would best meet the needs of our youth and society from the standpoint of general education?

The results[1] presented here are the outgrowth of an effort to ascertain the answers to these questions. It was felt that a survey of the opinions of present-day automobile owners, service managers, and automobile manufacturers would lead to a greater insight of the problem facing public school administrators concerning the general educational type of automotive instruction that should be offered in the public high schools.

One rather conclusive fact brought out in this study showed that 87 per cent or more of each of the groups of respondents believed that public high schools should offer instruction dealing with automobiles. Furthermore, 62 per cent or more of each group went so far as to indicate that they believed the instruction should be a requirement for all students who graduate from high school.

Regarding the relative importance of automobile selection, operation, and care, the respondents were in close agreement. The major activities as checked in descending order of importance were (1) economical and safe operation, (2) proper care and maintenance, and (3) intelligent selection. The majority of the respondents also were of the opinion that high schools should offer a comprehensive type of instruction dealing with all three activities: namely, automobile selection, operation, and care.

It must be recognized, however, that before suitable instruction can be offered, the instructional units dealing with automobile selection, operation, and care must be identified and listed. As a part of this study, various selected items dealing with automobile selection, operation, and care were submitted to the respondents for their approval as to whether or not the items should be taught in the public high schools.

As shown in Table I, there was similarity in the opinions of the respondents concerning the items of instruction dealing with the selection of an automobile that should be taught. Items such as, automobile insurance, cost of owning an automobile, automobile nomenclature, and methods of comparing different automobiles were checked most frequently by the respondents. On the other hand, items dealing with automobile manufacturing and distribution were checked with the least frequency. It is interesting to note, that a larger percentage of the automobile owners checked all items dealing with automobile selection than did any of the other groups of respondents.

TABLE I. Opinions of Respondents Concerning Instruction Which the High Schools Should Offer Dealing With the Selection of Automobiles

Items	*Automobile Owners (371)**	*Service Managers (225)*	*Automobile Manufacturers (16)*
	Per Cent	*Per Cent*	*Per Cent*
How to determine the kinds of automobile insurance needed	90	83	74

[1]Based on findings in the author's doctoral dissertation, "Educational Needs and Interests of People Concerning the Selection, Operation, and Care of the Automobile," University of Missouri, Columbia, 1951.

Items	Automobile Owners (371)*	Service Managers (228)	Automobile Manufacturers (16)
	Per Cent	Per Cent	Per Cent
How to estimate the cost of owning an automobile, such as annual depreciation and future repairs	88	75	68
How to locate and name some of the more important parts, such as carburetor, generator, oil filter, etc.	87	77	62
How to test and compare different automobiles before purchasing	87	70	74
How to interpret basic automotive terms, such as brake horsepower, wheelbase, compression ratios, etc.	82	65	44
How to register an automobile with the state motor vehicle license bureau	80	73	62
How to determine reliable automobile dealers	78	68	62
How to purchase an automobile through a finance plan	73	72	57
How to determine the type of transmission needed	68	62	50
How to determine the size of an automobile needed	64	49	37
How automobiles are manufactured and assembled	61	41	25
How to select automotive accessories needed	59	48	62
How automobiles are distributed and sold	52	30	44

*Number of respondents.

As revealed in Table II, automobile owners, service managers, and automobile manufacturers were in close agreement with respect to the items of instruction public high schools should offer dealing with the operation of the automobile. All items listed dealing with the operation of the automobile were checked by 62 per cent or more of the respondents. In view of this fact it may be assumed that all the items listed should be included in a high school course.

TABLE II. Opinions of Respondents Concerning Instruction Which High Schools Should Offer Dealing With the Operation of Automobiles

Items	Automobile Owners (371)*	Service Managers (228)	Automobile Manufacturers (16)
	Per Cent	Per Cent	Per Cent
How to drive and park safely	95	95	93
How to develop sound driving practices, such as checking safety condition of the automobile, observing traffic regulations, etc.	94	97	100
How to avoid carbon monoxide fumes	92	92	93
How to start an engine that is flooded, vapor locked, wet with moisture, etc.	91	86	87
How to break in a new or overhauled automobile	91	83	87
How to check engine operation by reading instruments on dash panel	90	92	87
How to start and warm up an engine	89	95	87
How to meet emergencies, such as a flat tire, blown electrical fuse, stuck horn, etc.	88	83	87
How to detect faulty automobile operation, such as engine misfiring, knocking, loss of power, etc.	86	62	74
How to start an engine by pushing or towing the automobile	85	85	87
How to select automotive products, such as gasoline, oil, antifreeze, etc.	83	65	81
How to measure fuel and oil consumption	79	72	81

*Number of respondents.

It is evident, as shown in Table III, that automobile owners believed that more items dealing with the care of the automobile should be taught by public high schools than did any of the other groups of respondents. Furthermore, the responses of all groups indicate that it is far more important for public high schools to teach the students how to determine *when* an automobile needs service and repair than it is for them to teach the students *how* to make the actual automobile repairs themselves. The respondents generally believed that the fundamentals of automobile care should be highlighted in general education, but that details of the same would result in a vocational emphasis and would benefit only individuals entering some phase of the automobile industry.

TABLE III. Opinions of Respondents Concerning Instruction Which High Schools Should Offer Dealing With the Care of Automobiles

Items	Automobile Owners (371)*	Service Managers (228)	Automobile Manufacturers (16)
	Per Cent	Per Cent	Per Cent
How to determine when an automobile needs service, such as chassis lubrication, wheel bearings packed, radiator cleaned, etc.	87	85	74
How to take economical care of automotive units, such as switching or rotating tires for more even wear, etc.	89	82	68
How to do simple servicing, such as checking tire pressure, adding water to battery, adding oil to engine, etc.	86	76	74
How to determine when automobile needs repairing, such as engine overhaul, brakes relined, carburetor overhaul, etc.	85	61	50
How to make minor adjustments on automobile, such as fan belt tension, idling speed, aim of headlamps, etc.	83	37	25
How to locate electrical troubles such as loose connections and shorted wires	83	38	37
How to make minor repairs, such as replacing a fan belt, patching a flat tire, tightening loose parts, etc.	82	62	62
How to determine when automobile needs major adjustments, such as wheel alignment, clutch pedal play, valve tappet clearance, etc.	81	61	44
How to make simple body repairs, such as eliminating body rattles, adjusting door latches, touching up scratches on painted surfaces, etc.	77	35	31
How to replace such automotive units as sparkplugs, thermostat, battery, etc.	73	35	25
How to select and use automotive hand tools	73	33	25
How to clean upholstery	64	56	68
How to read drawings, such as electrical wiring diagrams, lubrication charts, etc.	63	32	31
How to install accessories, such as grille guards, side view mirror, seat covers, etc.	46	21	19
How to make major repairs, such as engine overhaul, clutch reconditioning, reline brakes, etc.	43	15	19

*Number of respondents.

Implications

This study proves rather conclusively that neither the driver education courses as currently provided, nor the traditional courses dealing with automobile repair are meeting the general educational needs of our youth. Therefore, an attempt should be made to broaden present nonvocational automotive high school courses to include instruction in the selection and care of the automobile, as well as safe and economical operation. The major emphasis in these courses should first be upon safe and economical operation, with proper care and maintenance and intelligent selection ranking second and third in order.

To help insure that the automotive instruction will be effective, adequate class time and laboratory space must be provided. The instructional equipment should include an atuomobile for behind-the-wheel driving, plus parts for demonstration purposes, and various automotive units for disassembly and assembly purposes. Likewise, administrators must make provisions for thorough instruction dealing with automo-

bile selection, operation, and care to carry credit toward graduation on the same basis as other subjects in the high school program.

It must also be recognized that a course involving driver training is very time consuming on the part of the instructor. As a result of this, reasonable total teacher time should be kept in mind when scheduling the staff for instruction dealing with automobile selection, operation, and care.

Another implication resulting from the findings in this study lies in the field of teacher training. Not only should high schools broaden their programs to include automotive instruction, but also teacher training institutions must expand their offerings to include instruction dealing with automobile selection, operation, and care in order that qualified teachers will be trained for the teaching of this subject in the public schools.

Satellites and Missiles

W. G. HJERTSTEDT

Chicago, Ill.

GIMBAL: An instrument used for keeping a suspended object in a horizontal position.

GRAPEFRUIT: A term applied by foreign newspapers to a small satellite, particularly to the 6.4 inch satellite designed by the United States.

GREEN HOUSE: A check station where assumed flight tests are to be conducted.

GUIDED MISSILE: A rocket that flies, instead of traveling in a ballistic trajectory. It may be called a pilot-less plane. Matadors and Sparks have wings like planes. Other guided missiles go with such a terrific speed that they do not need wings.

GYRO: A circle, ring or spiral. Also a term applied to a gyroscope or gyro compass.

GYRO COMPASS: An instrument similar to the ordinary mariner's compass. However, it employs a gyroscope instead of a needle.

GYROSCOPE: An instrument which consists of a rotating wheel. A gyroscope is so mounted that its axis moves freely in all directions. Regardless of the mounting it indicates and maintains a perfect direction.

HOLE: Combat control center of the Strategic Air Command. It is located in the lower tier of a large sand colored brick building south of Omaha, Nebraska. In case of emergency the "Hole" automatically seals itself off from the outside world. It has air conditioning, its own power system, fuel and water supply, and a supply of food for one month.

HONEST JOHN: A free rocket made by the United States Army. Honest John is 27 ft. long and can carry an atomic war head large enough to destroy a fort. It is an adaptation of the Redstone missile.

HULL: The outer casing for a large rocket projectile, missile or rocket.

HYDROGEN: Chemical symbol: H. Hydrogen is a colorless, odorless, and inflammable gas. With oxygen it combines chemically to form water. Hydrogen is one of the lightest known elements and in this respect would be ideal in the design of missiles and rockets. However, it requires large tanks and boils away easily unless it is specially cooled.

IBM: International Business Machine.

IGY: International Geophysical Year.

INERTIA: That property by which matter retains its state of rest as long as an external force does not act upon it. See *Galileo.*

INFERIOR PLANETS: See *Planets.*

INPUT: Any idea offered on any subject pertaining to missiles.

INSPECTION AND REPAIR AS NECESSARY: IRAN.

INSTRUMENTATION PACKAGE: A number of devices employed in a man made satellite and used for recording scientific data. An instrumentation package is composed of a number of layers which are from bottom to top in the following order:

1. A mercury battery power supply.
2. Amplifier for cosmic ray recording device.
3. Amplifier for meteorite counter.
4. Memory unit to store cosmic ray data.
5. Radio coding system to put data into shape for transmission.
6. Memory unit to store meteorite count.

INTERFEROMETER: An instrument for measuring small lengths or distances by means of the interference of two rays of light.

INTERMEDIATE RANGE BALLISTIC MISSILE: IRBM.

INTERNATIONAL BUSINESS MACHINE: IBM.

INTERNATIONAL GEOPHYSICAL YEAR: IGY.

ION ROCKET ENGINE: An engine that develops thrust by means of ions accelerated to high velocities by passage through a high electrical field. The thrust of an ion engine is not very great. However, an engine of this type, due to its low fuel consumption, is well suited to powered flight in outer space.

IONOSPHERE: The region of the atmosphere which lies just beyond the stratosphere and sixty miles above the surface of the earth. The ionosphere extends several hundred miles up.

IRAN: Inspect and repair as necessary.

IRBM: Intermediate Range Ballistic Missile.

IVORY TOWER: A vertical structure to hold a missile while testing its engine.

JET PROPULSION: A method of producing a propelling force upon a rocket or missile through the reaction of a high velocity jet. A jet uses the oxygen from the air and is discharged from the rear.

JUPITER: The largest planet. The diameter of Jupiter is eleven times that of the earth and about one-tenth the size of the sun. In order it is the fifth from the sun, the mean distance being about 483,000,000 miles. The period of its revolution is 11.86 years. Jupiter has eleven satellites.

By 1965, according to one source the energy requirements of home central cooling systems will be equivalent to some 100 million barrels of oil a year. — *Petroleum Newsnotes.*

The cardboard-based games youngsters enjoy will last longer and look better with a thinned coat of fresh, white shellac. — *Shellac Information Bureau.*

Problems and Projects

NERVE-RACKING SHOP PROBLEMS*

C. T. STOTT
Instructor, Hanover Senior High School
Hanover, Pa.

Lives there a shop instructor so fortunate, and blessed with tranquil mind, who can honestly say, "I have no problems"? If so, may we bow humbly in his presence and ask reverently that he cast forth to us and others his most worthy secret.

For years, and for many moons, have we labored in the shadow of doubt and worry, and we have counted with anguish the growing number of silver hair that have fallen in vain from our intelligent, but not fertile, heads. Our brow bears deep furrows of suffering engraved upon its surface, and our eyeballs, after long hard years of searching duty, have become fixed in their sockets and can only see in the general directions of Cape Cod and Walla Walla.

Yea, and our ulcers — we must not forget our ulcers. They have thumped, growled, and caused us suffering with the delight of a thousand fiendish devils. We have soothed and coddled them by consuming gallons of Elsie's home brew and our obesity has finally broken the sturdy springs of the bathroom scale.

We have acquired the quick nervous emotions of a shell-shocked war veteran and our stomachs can no longer stand the sight of free flowing red blood.

Yea, we have problems — just oodles of them. Would you ask us to cite just a few? We shall gladly pour forth some of our sorrows.

1. "I have classes of approximately forty-two students in my shop. I have room and work stations only for twenty-five. What shall I do?"

2. "My principal is an ugly little man with an inferiority complex. He doesn't like shop or shop instructors and he gives me all the *goof-offs* in the school. What shall I do?"

3. "I made out a requisition for materials last year based upon the number of students I thought I would have this year in my shop. I underestimated my load by ten students. However, my original requisition was cut almost in half and I now have very few materials left for the rest of the year. What shall I do?"

4. "I'm teaching the son of a school board member in my shop class and he's a continual troublemaker. He is very poor at shop work — but I'm afraid to give him a low mark because his father is sure to give me the ax. What shall I do?"

5. "My principal and supervisor feel that the shop department should be the general maintenance department for the whole school district. I cannot plan or teach an individual lesson or give demonstrations because we are continually tied up with maintenance work. I'm afraid to say anything or do anything for the best interest of my shop course for fear that both men will cut requisitions and make teaching miserable. What shall I do?"

6. "I have one very poor band saw, and it has become dangerous to operate. I've tried to get a new one, but the superintendent of schools and a local board member, after a recent inspection, said the machine was perfectly all right and that I would not get a new one. I'm afraid to let my boys use the saw for fear that one or more would injure themselves, but the machine is vitally needed in our work. What shall I do?"

7. "I have ordered texts in woodworking for three successive years. I've never received a one. My superintendent says that the shop doesn't need textbooks. Naturally, I must mimeograph and lecture about every little detail in shop work. What shall I do?"

8. "I have five very rowdy boys in my shop class of thirty-three. I've used every means possible to bring them into line, except paddling, since this is illegal in our state. My principal will not suspend or back me on any punishment and the boys seem aware of this fact. They are continually *lousing up* the rest of the class. What shall I do?"

Dear readers of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION: Do you have answers for some of these? If so, let's hear from you.

*Examples in this article were taken from a research paper prepared at Western Maryland College Graduate School, Westminster, Md.

ENGINEERING DRAFTING CHANGE NOTICES

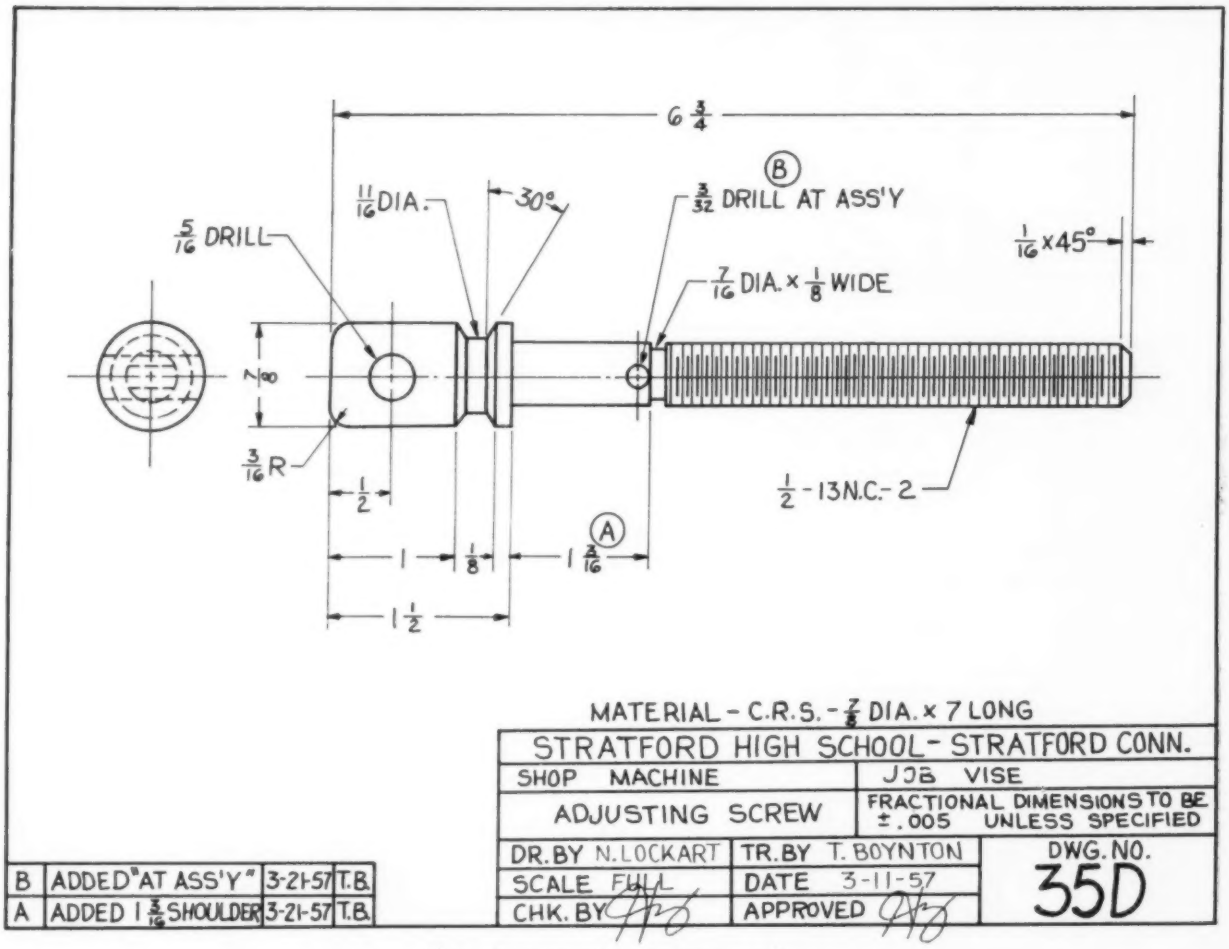
HERBERT W. YANKEE
Assistant Professor of Mechanical Engineering
Worcester Polytechnic Institute
Worcester, Mass.
Formerly Instructor of Drafting
High School
Stratford, Conn.

Many high schools and technical schools undoubtedly provide space in their drafting rooms for storage of tracings for shop projects. Here at Stratford high school, all projects made in our shops are first drawn in the drafting rooms and prints are then issued to the shop concerned. The tracings are catalogued according to a prescribed numbering system and are recorded in a master index which is available to all shop instructors in the school system. The tracings are filed numerically and are thus stored and available for immediate use.

For many years, we have used the system of Engineering Change Notices as a check on the correctness of the drawings. Each shop instructor is given a supply of change notices. When an error on the drawing is detected or a design change is necessary, the instructor or pupil making the project fills out a change notice and sends it to the drafting room. One of the drafting pupils, whose assignment is to maintain the tracing files, removes the tracing and makes the changes in accordance with the requested information on the change notice. The tracing is then printed with the prints being sent on to the shop and the tracing is filed.

As the error is detected on the drawing, the change notice is carefully filled out in compliance with the format of the change notice. Most shop instructors award credit for this duty. When the notice is received by the drafting room, the pupil in charge of the tracing files makes the changes in conformance with standard industrial procedures and the changes are noted on the tracing. Should there ever be any question of what changes have been made on a given project, a quick examination of the record of change on the tracing (or print) would reveal the answer.

It has worked extremely well on countless occasions. The change notices, excluding occasional approvals and checks by the instructors, are for the most part pupil-accomplished. The system is simple enough so it can be readily explained to pupils. It is efficient in that changes can be made on the same day as they have been detected. It serves as an excellent check on the correctness of the drawings in use in the shops and also provides the pupils with drawings that are completely up-to-date with regard to design changes. Finally, it acquaints pupils with the importance of the liaison between the shops and the drafting rooms which of course is the objective in actual industrial practice. We would recommend this system to any school having problems resulting from errors on shop prints.



Shop drawing with changes made

Stratford High School
Technical Arts Department
Engineering Change Notice

Shop: Machine Shop
Pupil: John Sheppard
To: Room A-2, Machine Drafting
Date: March 7, 1957
Instr. signature *PJ*

* * *

Please make the following changes on the tracings as indicated below:
Dwg. name Adjusting Screw
Dwg. No. 35 Det. No. 35D

Description of Change

1. Add "at assembly" to 3/32 drill note
2. Remove threads and move neck to right to 1 3/16 dim.
3. .....
4. .....

* * *

Sketch of Change If Necessary

SCHOOL CALENDAR

BEN TAUBENFELD
Teacher of Graphic Arts
Junior High School 71
New York City, N. Y.

This school calendar was designed and printed by a boy in the 9th grade of our junior high school. We feel that although the school calendar is not a novelty, this particular one is of a new and different caliber. First of all it is used for educational purposes. Presidents and famous historical personalities were used on each page. We also used some of their quotes, so that the children of the school would acquaint themselves with these people. At the bottom of the calendar we made up our own sayings as a further means of attraction.

The idea was very successful with children, teachers, and administrators. The board of education of the city of New York has also accepted it for its publication in the Graphic Arts Annual.

The calendar was made by one boy, Amado Vazquez, who at the present time is in the ninth grade.

The following is the procedure used in making this calendar:

1. The pictures of the famous personalities were selected. Each famous person was selected because his birthday coincided with one of the months on the calendar. For example, Benjamin Franklin was born in January; hence, his picture was used for the January-February calendar.
2. *a*) Each chosen picture was transferred onto a piece of linoleum;
   b) The linoleum was then cut using linoleum cutting tools;
   c) When completed the linoleum was cemented onto a piece of ¾-in. wood, same size as the linoleum. We then had a completed linoleum block.
3. We then cut our paper and board to size: 8 by 8½ in., 8 by 9 in., 8 by 9½ in., 8 by 10 in., 8 by 10½ in., 8 by 11 in., and 8 by 11½ in.
4. The next step was to lock up the linoleum block into a chase, and

printing each block separately, using a different color for each.

5. The months were printed from linotype. The quotes were printed from hand set type. The cover was printed from hand set type.
6. Each page was printed three times: *a*) the linoleum block and the quote; *b*) the months; the slogans; *c*) the line separating the months.
7. The calendar was then put together, stapled, and a hole punched in the

8×8

ROBERT E. SIMON JUNIOR H. S.

1958
SCHOOL CALENDAR

B. SALLEN, Principal — B. TAUBENFELD, Instructor

Art Work and Calendar Made by Amado Vazquez

Class 9-4

8×8½

Benjamin Franklin

"One Today is Worth Two Tomorrows"

1958 JANUARY 1958						
S	M	T	W	Th	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

1958 FEBRUARY 1958						
S	M	T	W	Th	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	

"ALL MEN ARE BROTHERS"

8×9

Thomas Jefferson

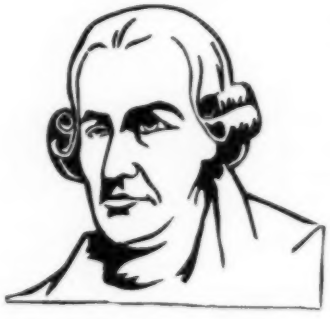
"All Men Are Created Equal"

1958 MARCH 1958						
S	M	T	W	Th	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

1958 APRIL 1958						
S	M	T	W	Th	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

"SPRING IS HERE"

8×9½



John Pierpont

"Be It Ever So Humble There's No Place Like Home"

1958 MAY 1958						
S	M	T	W	Th	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

1958 JUNE 1958						
S	M	T	W	Th	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

"ONE NATION INDIVISIBLE"

Fig. 1. Calendars for January to June

8×10

John Paul Jones

"I Have Not Yet Begun To Fight"

1958			JULY			1958
S	M	T	W	Th	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

1958			AUGUST			1958
S	M	T	W	Th	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

"LET FREEDOM RING"

8×10½

Dwight D. Eisenhower

"Intangibles - - - - Real Treasures That Free Men Possess"

1958			SEPTEMBER			1958
S	M	T	W	Th	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

1958			OCTOBER			1958
S	M	T	W	Th	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

"HAPPY SCHOOL DAYS"

8×11

Woodrow Wilson

"Let Us Make The World Safe for Democracy"

1958			NOVEMBER			1958
S	M	T	W	Th	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

1958			DECEMBER			1958
S	M	T	W	Th	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

"PEACE ON EARTH"

8×11

Season's Greetings

and a

Happy New Year

FACULTY & STUDENTS

I.H.S. 71. M.

Fig. 2. Calendars for July to December

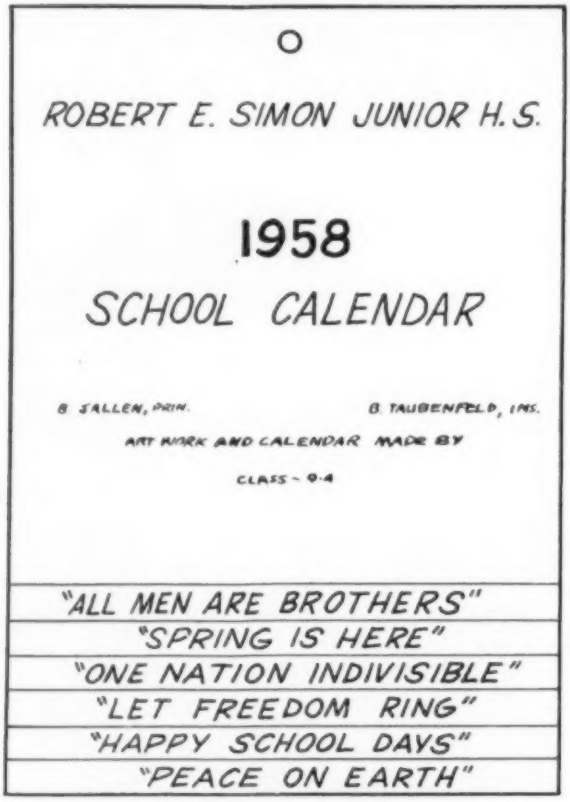


Fig. 3. An assembled calendar

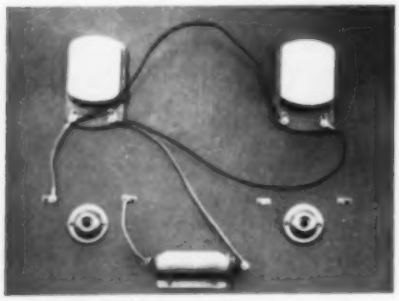
center on top, using an eyelet machine.

We found that the calendar was so successful that the school decided to use this procedure in making all their future calendars.

ELECTRICAL WIRING WITH SNAPS

A. E. McPHEE
San Fernando Junior High School
Los Angeles City Schools
Los Angeles, Calif.

The transition from a schematic diagram to actual wiring is made easily and quickly by using a teaching aid, utilizing wiring snaps. The teaching aid consists of two buzzers and two push buttons with two flashlight cells for power mounted on a 17 by 24-in. plywood panel. Standard buzzers are mounted inside double size wooden replicas. The enlarged models emphasize *showmanship* and allow the whole class to see the wiring more clearly.



Electrical diagram made on the chalkboard with wire and snap fasteners

This novel layout features the use of wires with snap-on fasteners for quick connection. Connections to the same point may be pyramided together.

In practice as a teaching aid, a bell circuit is drawn on the chalk board and explained. Then with colored chalk, one line, representing one connection, is drawn over the original schematic. Students note which points the line connects and a student is selected to make the proper connection on the board. No time is lost by fumbling with terminals as the wires can be snapped in placing insuring a positive contact. The schematic is wired in this manner, one wire at a time until the circuit is complete. Class interest and attention reaches a peak as the circuit is tested to see if it was wired correctly. Advantage can be taken at this time to stress any point deemed desirable. All standard bell circuits can be demonstrated on this board.

The illustration shows a simple buzzer circuit done with white wires and another buzzer added in parallel with black wires. The black and white wires are used to illustrate that the basic bell circuit of one buzzer and one push button occurs in most variations of bell circuits. Variations of this same method may be used to demonstrate light circuits, series and parallel circuits, and even radio schematics.

The Nu-Way snap connectors are available at Burstein Applebee Company, 1012–14 Mcgee Street, Kansas City 6, Mo., and at other electrical supply houses.

ROLL-AROUND BOOK AND MAGAZINE RACK

ROLAND BACON
Head, Department of Industrial Arts
George Washington High School
Danville, Va.

This project resulted as attempts were made to re-design the old tried and true magazine rack in accordance with contemporary ideas. We have roll-around television sets, roll-away beds, portable snack bars, etc. Why not a portable library for the home? When cleaning time for floors comes it is easily moved about.

High school students have called this a lazy man's idea but many of them have asked to make it.

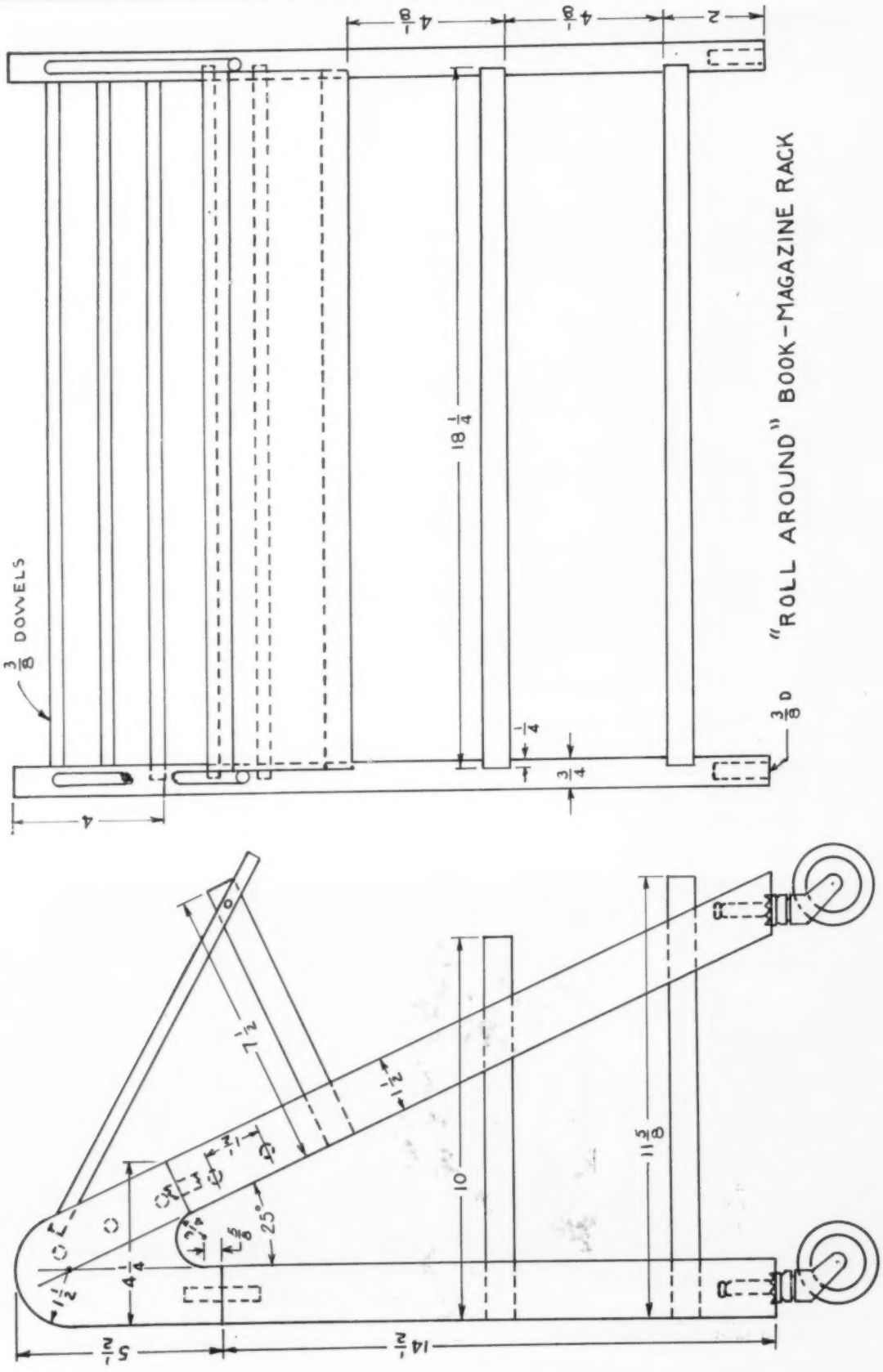
This particular one was made of Philippine mahogany. The dowel rods were finished in flat black enamel and many who have seen this project have the impression that the rods are wrought iron. The casters selected were the rubber tired ball bearing type with a brass plated finish.

Suggestions for Construction

1. Work material to correct size.
2. Complete necessary edge to edge gluing for wide surfaces.
3. Make dowel joints for fastening legs to top pieces. A spline joint may be used in the place of dowels if desired.

NOTE: It is better to leave the tops square or notched for clamping purposes until the legs have been glued to tops. After gluing the tops may be rounded. The front legs should also be left square on bottom ends.

4. Make dado joints for shelves. These may be cut on the circular saw by using the dado head or by hand tools. If machine methods are used a temporary brace should be tacked on connecting the legs for extra support when cutting.
5. Bore holes for dowel rods.
6. Cut bottom of front legs to correct angle.
7. Bore holes for casters.
8. Sand all parts.
9. Assemble the parts by gluing and clamping. The entire assembly must be made at one time except for the diagonal braces for the book rack.
10. Apply the finish desired.
11. Install casters.


"ROLL AROUND" BOOK-MAGAZINE RACK
3/8 DOWELS
4 1/8
4 1/8
2
18 1/4
1/4
3/4
3/8 D
4
7 1/2
1 1/2
10
11 5/8
25°
1 1/2
4 1/4
5 1/2
14 1/2

Roll-around book and magazine rack

INEXPENSIVE DUST COLLECTORS FOR THE WOODSHOP

OMER K. McCALEB
Head, Industrial Arts Department
David Douglas High School
Portland, Ore.

Photography by **ROBERT N. LEPPERT**

Woodworking machines produce a lot of fine dust which may be taken for granted in many school shops, but it is a safety hazard, and a cleanliness problem. Woodshop instructors become acutely aware of this situation from time to time, but any attempt to solve it is usually met by the universal obstacle to school projects, money.

Adequate exhaust systems for the school shop usually start at prices well above two thousand dollars and extend upward in price depending upon type, installation, and extent of system. Such figures usually stop the instructor just inside of the administrator's office door, if not outside of it.

Extended observation and consideration by the author has led to the conclusion that the real problem lies with particles which can be suspended and transported by such air currents as exist within the shop. Particles which fall readily from the machine may be directed into a receptacle, or allowed to fall upon the floor for collection by the custodian.

Forgetting about chips and shavings, dust is the remaining consideration. Industrial dust collectors operate as vacuum systems, so why not use vacuum cleaners as dust collectors?

A local secondhand store gladly produced 16 old vacuum cleaners in exchange for two twenty dollar bills, and operation cleanup was under way.

Time, imagination, and some materials from the sheet metal shop then began to produce a number of dust collectors for those machines which were the worst offenders.

The disk sander is the best example of a machine whose dust fills the air, but can be made almost one hundred per cent dustless with the addition of a vacuum cleaner with an air filter on the exhaust. Figure 1 shows the installation of a pre-1930 model Royal which was wired through the sander switch parallel with the motor so that the sander cannot be run without the dust collector.

Glenn S. Crisp, machine woodworking instructor who made many of the adaptations shown, is pictured operating the disk sander.

Figure 2 shows a hood attached to the shaper fence for the purpose of directing shavings into a receptacle beside the machine. A vacuum cleaner will not lift the heavy shavings, but it will pick up the fine dust which otherwise floats around in the air. This installation is best made using flexible tubing as shown in order to

Fig. 1. Vacuum cleaner attached to the disk sander. Fig. 4 (at right). The vacuum cleaner attached to the band saw
— Photographs, courtesy of Robert N. Leppert, Portland, Ore.

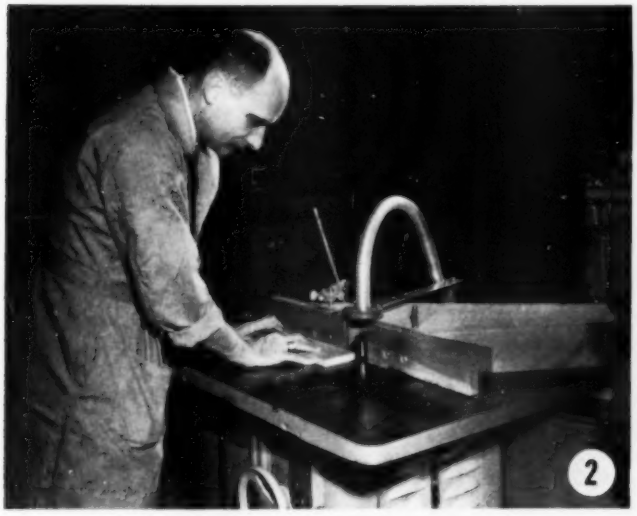


Fig. 2. Dust remover attached to the shaper. Fig. 3. The vacuum cleaner attached to the power saw. Jack B. Young, industrial-arts instructor, is shown operating the radial saw

facilitate the necessary changes in setup.

The radial arm saw ejects its sawdust with sufficient force to make collection a simple matter. It has been observed, however, that much of the fine dust produced refuses to stay with the heavier particles so it is free to hang around in the air unless directed elsewhere. Figure 3 shows a vacuum cleaner mounted on its side with the pickup hood directly behind the saw. The bag must be emptied every day on this vacuum since all of the sawdust is collected. The upper end of the vacuum hood is masked off to keep sawdust from bouncing back toward the saw.

Jack B. Young, industrial-arts instructor is shown operating the radial saw.

Refinements for the radial saw installation might well include a baffle system for directing the heavier material into a container other than the vacuum bag.

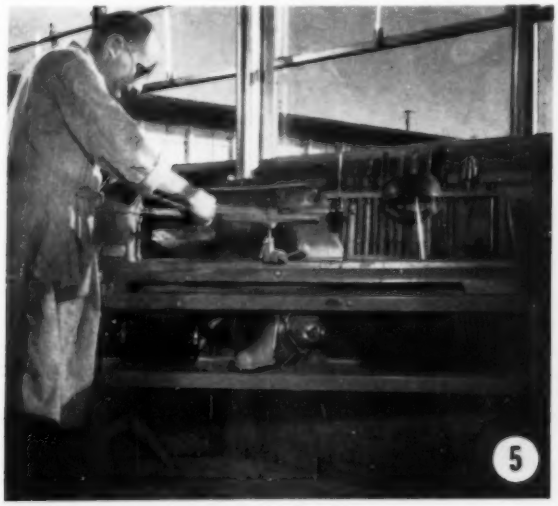
Band saw dust is usually fine, and should be collected in its entirety. Carefully located baffles fastened within the lower wheel guard will aid in directing all of the dust out the spout where it is collected as shown in Figure 4.

Sanding lathe work can produce a lot of dust which is easily collected as shown in Figure 5. The vacuum head and bag are mounted on a shelf underneath the lathe and connected by means of a flexible tube to a horn which may be used horizontally for spindle work as shown, or turned to a vertical position when sanding faceplate work either inboard or outboard.

A small table saw used in the carpentry shop for making lumber used in the construction of scale model houses is shown in Figure 6. It has been fitted with an old vacuum which serves to collect the entire output of sawdust for a two-hour period of operation. The location of this saw makes it desirable that no sawdust is spread around the area.

The author is shown pointing to the dust collector bag which is an important consideration in each installation. The bag must be in such a position that removal for emptying is easy. The bag should also extend below the motor so that heavy particles will fall away from the fan.

Several other vacuum installations are in the planning and construction stages in the various shop areas of the school. Specific questions will be answered if directed to the author.



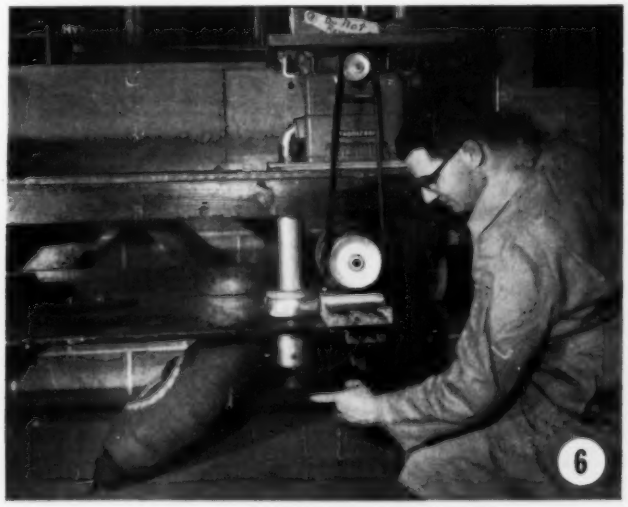


Fig. 5. The vacuum cleaner removing the dust produced when sanding on the lathe

Fig. 6. The vacuum cleaner attached to a small saw for cutting lumber for scale models

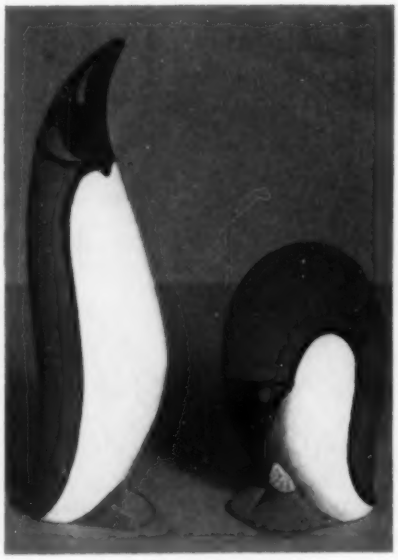
WHITTLING PROJECT— MR. AND MRS. PENGUIN

BEN HUNT
Hales Corners, Wis.

Although these penguins are stylized, their identity is quite apparent. I have purposely omitted the flippers to make them still more streamlined. Outside of getting a nice round egg, the whittling is rather easy. Actually it will take longer to sandpaper them smooth. Sanding is done first with medium sandpaper to eliminate all the knife cuts and then with fine paper. The eyes are pressed in with a hollow nail set as usual.

They may be painted with either water color or airplane dope, whichever you prefer. Before painting them with water color it is sometimes necessary to wet the wood to raise the grain and when dry, sand it smooth again before applying the color.

With dope this is not necessary. Mix some black and white to get a medium gray for the back. Although the entire eye of a penguin is black, a fine white line around it shows up better. In order to make the egg more apparent it may be mottled with light brown or buff spots.



The finished project

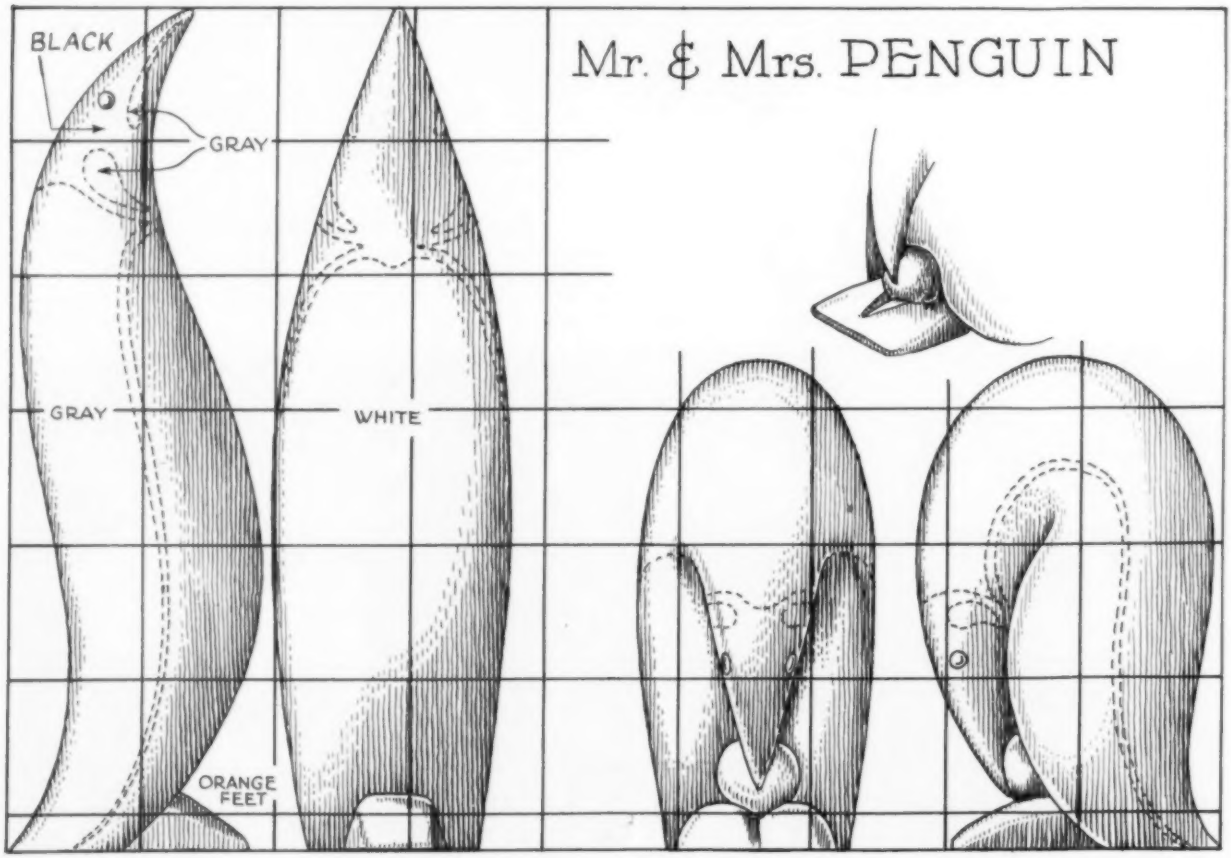
If you use water or poster color, give the birds a good coating of lacquer or plastic spray, or several coats of clear lacquer for a glossy finish.

SQUARING-SHEAR SAFETY

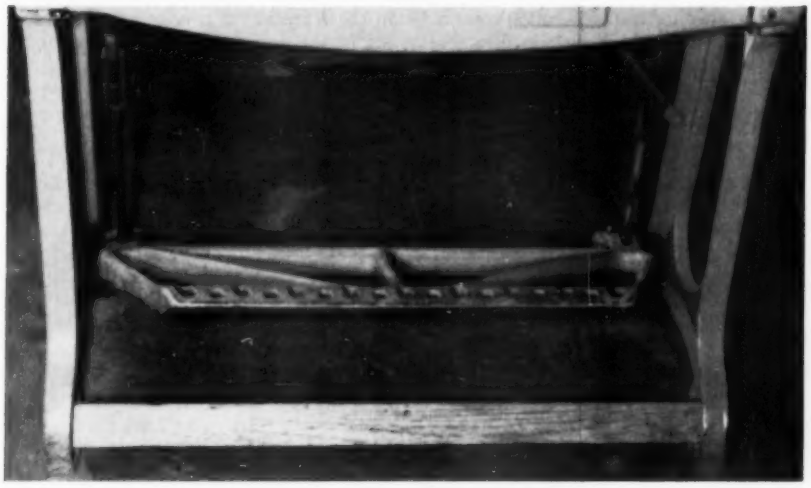
CARL H. HUBACHEK
Branford Senior High School
Branford, Conn.

Although the squaring shears is not a particularly dangerous machine, especially when the blades are properly guarded, it does surprisingly enough cause pain frequently to both the user and the observer.

While the user is quite careful to keep his fingers away from the blades when he steps on the treadle with one foot he frequently neglects to keep the other foot away from beneath the treadle, a bit of forgetfulness which is short-lived, for the treadle on the downward stroke either bruises the shin or strikes the foot or toes or possibly all three. This can be quite painful. The observer is frequently trapped by his interest in the work being performed. His lack of worry as to the whereabouts of his feet is soon called to his attention when the treadle hits one or the other of these vulnerable parts of the body. He is quite likely to have both feet hurt. Although one is well advised to stay a reasonable distance away from anyone who is operating any shop equipment there are times when one must be close



Detail drawing of the stylized penguins



Guard for the squaring shear

to a machine operated by another, i.e., when one is instructing or helping on a two-man job.

Toe and foot crunching and shin bruising by the squaring shears can be eliminated almost entirely by dropping a 2 by 4-in. piece of some hardwood, oak in the case shown in the picture, in the recesses in the front legs of the shears. The length should be chosen to facilitate the easy removal of the wood by lifting one end, for with the wood in place the length of cut is restricted due to the shortened stroke of the treadle. Without removing the wood from the shears the piece shown allows slightly more than one half the whole length (total 36 in.) to be used. Not only does the stop help prevent foot injuries but it also protects the floor from damage by stopping the treadle before it hits the floor.

Since we began using the stop we have had no feet or leg injuries caused by using the squaring shears.

GENERAL EDUCATION IN INDUSTRIAL ARTS

ALEXANDER F. BICK
Milwaukee Public Schools
Milwaukee-Downer College
Milwaukee, Wis.
Stout State College Summer Session

An introduction into shop-made dies for forming metals.

"Industrial arts is general education."
"There is no single statement of policy on which all industrial arts people are so one-hundred per cent agreed."
(AAIA Convention quote)

The objective in the statement given is met through exploration with tools and materials of industry, the end product being a *doing* know-how. I would not like to think, however, that the aquisition of skills of a *skip here skip there* nature (not master of any), is all there is to general education. This is not a criticism of industrial arts since we are fairly unanimous in recognizing the drive of industrial arts to be, not toward mastery, but toward exploration to the degree of knowing basic facts about shop subjects. On that ground, we can say that exploration in tool processes is

Pressed brass totem pole wall ornament showing sand and glass filled polyester dies for top mask. The dies are ready for use

general education. This is true, surely, but at the end of the purely exploratory period there comes a time for expanded study, using the learned skills, notice, in the building of mental pictures in constructive public education that reaches out beyond skills while at the same time it is teaching new and more skills in an endeavor to close up deficiencies in general education.

The *beyond skills* training is a *by skills* learning process; all shopwork being skills training by *doing*. The opportunity to apply the "I think I know how" is the fundamental advantage of industrial arts.

The thesis advanced here is a junior high school viewpoint. It is necessarily different from that seen by high school and teacher training college personnel. I believe it is on the lower level that public education reaches its maximum importance and where deficiencies are most glaring. Unfortunately, lower level problems suffer from the neglect of not having concentrated top-level attention. Most industrial arts writing and surely most convention oratory is that from the theoretical level of the training school and the administrator. Many excellent speakers and administrators have not taught lower level shop classes, and some perhaps did have experience in an age as obsolete as the 30's or 40's. One of the most trying assignments in all education is the present eighth grade shop. There, theories fall like autumn leaves and thin objectives show their thread-bareness on application. There, more than any other place, do we find that the times have changed. No longer can shop teachers indulge in time-stretchers such as *step by step, easy to difficult, a project for each lesson* medicinal procedure, nor does he fare very well giving *related information* talks on critical matters such as nuts and bolts. In old days, students were more or less receptive to such treatment because father would know the reason why. Today, without benefit of strength at home, and with the jitter of TV, and inane comic books, and the excitement from disk artists, and what not, students openly resent drag. They revolt at repetition. It is *killing*. They are on edge to *get the point* on the instant, long before the teacher is aware that his lesson has *clicked*. Students are yards ahead of the theorist. They want the climax without detail. If at all, detail is background and inarticulate. Thus, the old standard shop breeds revolt. One hears everywhere the shocking report of growing discipline problems. The reason is very simple: drag and repetition in old type shops.

You may wonder at the view expressed here. At the beginning, I wondered also. Why did I question the

standard setup and the *trusted* procedure? I had taught six or eight years when the futility of my effort pressed heavily upon me. How empty and repetitious the mere making of *things* actually was. The shop product was amateur. There was no question about it. It had no relationship to the professional with which I was well acquainted by direct contact during my training, and yet, the work of my students compared favorably with that of any I knew. It was truly the *manual training* type, that registers neither this nor that. Shall schools sponsor *trash?* was the challenge that demanded an answer. Was the prolonged *making of things* necessary, or were there not other ways, better ways perhaps, by which the public might be greatly benefited while still gaining in skills training? Understand, there would be no loss in skills training. Whatever was to be done must be accomplished by the *doing* method. Therefore, to foster mediocrity, when skills are one of the ends in any case has no reason. Why not explore the higher range of departmental potentials and apply its lessons to build men, build citizens, armed with the pattern for building?

I am speaking now of the general public. In compulsory shop, which the junior high school shop is, my students represent by far the truest cross section of future America. I would do this general public an injustice were I to fail to build for them, as builders of America, vivid mental pictures of that which they are to build. Let them not build puny gadgets. Why should they not work with and experience the solution of problems beneficial to public reasoning and constructive understanding, by a process of *doing*, mind you (and I stress this point) and thus clear up the darkly shadowed public concepts caused by the unthinking acceptance of mistaken half truths? For the citizen, there is no other or better source of true information. Instead of gadgets then, let them build patterns upon which the general public may think constructively. This is over-all building on the grand scale. In comparison, the gadget is an infinitesimal, unrelated, and disconnected part. A description of the method is given later.

I realize, this reaches beyond our present thinking. It is, however, reasonable that we reach out in this new age, particularly to avoid introversion. This is the objection to hearing the continuing quotation by convention speakers of the statements of John Dewey, as if we are never to advance beyond his day. He lived in a world of hand work and primitive industry by comparison. He rode about in horse cars. We live, as we know, in the midst of a phenomenal new revolution marked by awesome symbols such as elemental transmutation, cosmic travel, speeds beyond imagination, automation, etc.: there is no likeness between the two ages. No wonder one is constrained to say, give us men of sufficient vision who no longer lean on Dr. Dewey. Were this much revered teacher of teachers to live in our day, he would speak with fire and shame of industrial arts, which at so critical a time, is rudderless in a sea of diverse purposes, grinding out skills with nothing to use skill on, nothing upon which a citizen can build, nothing of a mental picture that might serve as a pattern for American growth, nothing that penetrates the departmental wall and breaks through into the life of the nation at large. There are deficiencies in the national education at industrial-arts level.

Observation of these deficiencies from the junior high school level opens up a horizonful of opportunity, and it is seen immediately that the potential of industrial arts is hardly touched as yet. Its real destiny lies *off to the north* of that to which most oratory points. The grand goal is never mentioned. Much is said about *doing*, about testing the *doing*, about *criteria for evaluation*, and about projects for *doing;* but nothing is said about doing with the doing, or of doing beyond the doing. The real purpose of industrial arts lies beyond the doing! It is to build a new America. The purpose of the shop, after basic exploration, is to build, by means of doing, the clear mental patterns that clinch life's destiny, that vividly show the trend in constructive application, and that outline the shape of America to be. For this, the trends of today are the clue to tomorrow.

The goal, "To Build a New America," so transcends present departmental aims as to set us free.

There is time in the shop program for constructive expansion. We find that true exploration runs its course at the one-third to one-half point in the semester. That amount of time is all that is needed for general education. The succeeding two-thirds time is repetition. Duplication of tool experience does take place on new projects, it is true, but it merely repeats in another situation what has been learned before. The procedure which employs repetition enters into the realm of vocational education, and this is beyond the intent and purpose of industrial arts. The result is *letdown*, and the degrading of that which is intended as good.

The two-thirds time should be given to problems of public need.

There are deficiencies in the education of citizens which are vividly evident in times of national stress. Some of these are in the precise area in which industrial arts operates, and immediately the deficiency becomes the obligation of the department to fill. One of these, and there are five or six major titles, is embodied within the broad category of business under the title, "The Problems of Competitive Manufacture." The schools know little about these problems, but the public knows less. Public misunderstanding of this phase of American life has caused endless distress through distrust, hatred, and injustice, first to one and then to another body of our people, and has produced useless and at the same time fabulous monetary loss and hardship again and again.

The following outline describes a junior high school project designed to fulfill the industrial-arts obligation to the nation in the area of timely, and needed public information where a maze of partial truths exist today.

The immediate and striking advantage of the procedure given below over that in the exploration-repetition plan of shop is:

1. The disappearance of discipline trouble.
2. The pressure toward precise and flawless work is student-centered.
3. The incentive is continuous.
4. The goal of industrial education is *real* and it is reached.
5. Shop attitude toward time and toward integrity of effort is alive.
6. The *ego incentive* is all but wiped out.

Here then, is *general education by doing*.

History: Upon completion of exploratory tool work, at a point where some were entertaining the first signs of *letdown*, having learned their lessons, announcement is made of a complete change of program. Next Monday morning: the class is organized as a competitive business. At the moment, it is the *board of directors*, electing a president, who then conducts the meeting. The teacher is an outside consultant whose view is consulted when necessary. A corporation financed by stocks at 25 cents each, limit 6 stocks, explores the possibilities of manufacturing a *self-selling* metal product to be produced by the most modern devices to sell at reasonable price to a limited clientele. There is no space here to recount the discussion which arrived at the type product and the kind of clientele, nor of what were the characteristics of a product with maximum sales appeal and price. Other officers are then appointed.

Selecting the Product

The second half of the first session was given to *product research*, under the first vice-president. The entire stu-

dent group now assumes the work of the design, drafting, and tool room departments:

The work began with a short discussion of problems in competitive manufacture, ranging from styling for appeal and manufacturing facility, through raw material supply and cost, to manufacturing processes. Charts cut much of the time element. Sales and financial problems also came up for review.

The class is divided into four sections, each working out its own product research and coming up with a mature idea.

Each group head in turn presents his group idea and endeavors to *sell* it to the officers, including the *consultant*. The entire group enters into the selection and finally votes for the best item. Cardboard mock-ups help some of the groups to promote their inventions.

Manufacturing Method — Second Lesson

The entire class becomes the manufacturing department under the 2nd vice-president.

1. Tooling: Special jigs, fixtures, dies, and machines are discussed, designed, and begun. Some are finished by the teacher, ready for the next session if this is required for continuity. The teacher is taxed to the utmost to keep the *machinery* running smoothly, and of course, to keep all personnel occupied.

2. Necessary shop adaptation of the *line assembly* idea. The placement of groups or of individuals in the scheme of high output. Since there are *favored jobs*, it is good policy to rotate them.

When preliminary planning is brought to a point where the first stage of production can be begun, the boys are placed at their posts and given the *go ahead* signal. Constant inspection by appointed officers or merely by the immediate officer, and final *post mortem* at the close of each session keeps the personnel alert to quality. Lecture, if it can claim this dignity, occurs in the minute of *pepping up* at the beginning, and at the half minute at dismissal. This affords plenty of time to say the pointed thing that energizes the proceeding.

Manufacturing the Product

The product is a family totem pole consisting of four or five masks in polished brass. These represent father, mother, brother, sister, and bird. Operators are arranged in line, and while the first lays out the blanks, the next cuts stock, and the remaining members trim to line, press in the dies, file edges, deburr, buff, polish, and lacquer. Another group prepares stock for hair, removing the multi-wired stock from electric cord, and then in order, they cut, form, curl by winding over rod, solder, and lacquer the hair. A third group makes the frame, cutting brass rod and wire, marking, annealing, notching, bending, soldering, polishing, cleaning, lacquering; and finally, the group fastens the masks to the finished frames by soldering and cleaning.

Delays in the production line call for a rearrangement of operators, adding or eliminating where necessary.

Selling Procedure

1. A board of directors meeting discusses the marketing method. Industrial procedures are discussed. Possibilities for sales of the class product at a P.T.A. meeting, in house to house effort, and through an intermediate agent at discount are considered and voted on. Advertising in the school paper, and the sales effort are left to the 3rd vice-president and his staff.

Final Session

The class experiences an easy sellout and could have sold three times its output.

The treasurer's report listed profit over costs of 95 per cent on stock investment. Comparison with typical industrial net of 5 to 7 per cent, showing chart.

The return of capital stock plus the profit.

Making the Dies

There are four dies, the use of industrial dies in schools has been beyond the realm of possibility all through industrial-arts history, as we all know. Today, schools may make their own dies. A certain important category of industrial dies, formerly made of steel, are now made in one tenth the time and at one tenth the cost, using sand and glass-fiber resins which harden at room temperature. The catalyzed liquid of thick consistency when thus filled is run directly over the model which has been set into a frame. The casting hardens into a die of granite-like surface, capable of pressures up to 30,000 p.s.i. Wear points may be steel reinforced; cutting edges and punches may be embedded; and if the die is large, it may be formed as a shell with column, beam, and truss structure below. Industry uses low-shrinkage Epoxy resins for binder, or combinations of Epoxy-Polyester. Schools may use the much easier handling Polyester alone. The shrinkage of this resin when glass and sand filled is such a small fraction greater than Epoxy that it is negligible, and is fully satisfactory for school use. Its fumes are not toxic.

The process of making dies in the shop is similar to that used by girls in cooking when they pour cake batter into molds.

Method for Casting Dies

First, make a sheet brass model of the mask as follows: Cut the blank out of No. 26 gauge brass, make a nose and eyebrow form from bent coathanger wire, set the brass blank on ⅛ in. felt or on a pad of cloth and hammer the wire form into the face from the back with a 16 oz. hammer. Stamp the upper and lower lids of the eyes from the front over end-grain softwood, using a blunted crescent-shaped punch. Softly curve the outer edge of the face all around over a rounded wood stake, using a leather mallet. Bend the center of the face slightly up between the thumbs, and last, work the high cheekbone area up on the rounded wood, working around it with a mallet.

Make the die by setting the model mask face up on a piece of window glass. Fill open spaces between mask and glass with modeling clay or soap. Wax mask generously. Place a ¾ in. high wood frame around the mask to contain the resin. Mix a 3 oz. paper measuring cupful of Castoglas (perhaps the most convenient polyester on the market, requiring but one hardener) with a teaspoonful of ground glass fiber (Castolite Company) and 3 oz. of coarse sand. Add ½ teaspoonful hardener. Mix and pour slowly to avoid bubbles. In an hour, loosen the hardened die from the glass with a chisel. Heat the mask over a bunsen burner and pry it off with a knife. Clean out the edges of the die, and then set it face up on a table. Wax the face of the die thoroughly, and set a second frame over the first. This should be held in position with two pins, one on each side of the frames. Mix Castoglas as before, and fill the second frame. When hard after several hours preferably, heat the castings and pry apart with a chisel carefully at several points on the parting line. Clean, and allow to cure until the next day. The dies are then ready to be used.

The students in our school are asking for the *manufacturing project;* no question about its popularity, both in the school and out. The change in the attitude of students is little short of amazing. Even so, shops cannot afford to go overboard on projects. They must be preceded by thorough and intensive exploratory work in tool processes, materials, approaches, and technical problem solving. After that, rather than doing time on repetitive work, learning through *doing* problem solving, on the grand scale in the areas of public education is a right way of fulfilling the challenge in the much heard statement, *industrial arts is general education.*

STRONG MODERN TAPERED LEGS

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The table legs described in this article are of a simple design, but they have great strength. There is no wobbling since it is the glue that makes the rigidity and not the holding power of the wood screws. However, if, in time, the glue fails then the screws will hold sufficiently to make the project serviceable. (One-half ton of live-weight has been placed on a coffee table without collapse.)

This type of leg does have one disadvantage. It can be used only on a project that has some type of a top with a facia, since the ¾-in. glue blocks are visible from the front unless hidden by a molding of some sort.

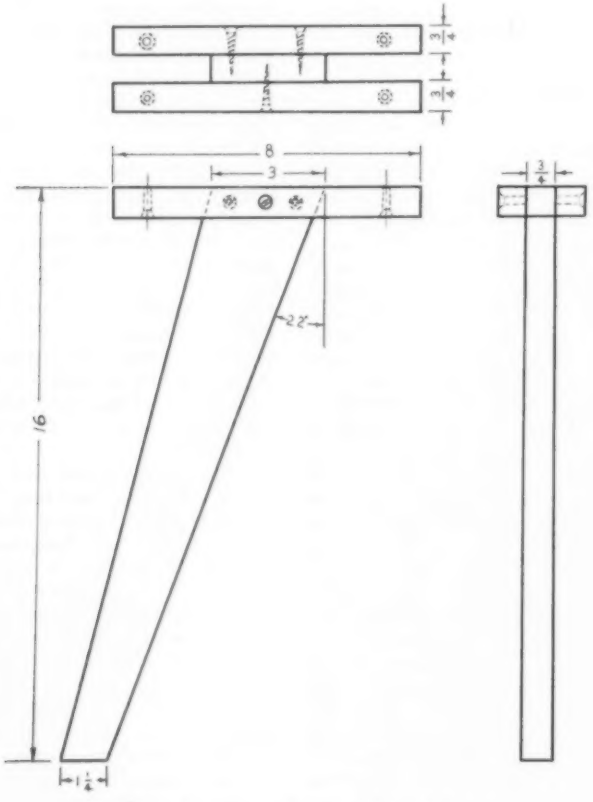
The legs should be made of the same type of wood as the project, even if it is a softwood.

As the drawing shows, two screws hold one glue block to the leg, but the other side has but one. This makes it possible to adjust both blocks the same angle before clamping. The glue must have hardened before the unit is planed.

The glue blocks should be at least 18 in. long. This length will provide safety in planing on the jointer. This planing will insure a perfect glue joint; however a disk sander will be satisfactory for this step, although it will not make the joint quite as accurate.

The glue blocks must be shortened before they are attached at a 45 deg. angle to the table. The outer edge of the leg should be even with the outer edge of the table.

The legs shown are designed for a coffee table, but their size can be altered for bookcases, end tables, or any project that calls for tapered legs.



Details of tapered legs designed for a coffee table

THE STURDY OAK

ORVILLE A. OAKS
Wilmette, Ill.

The sturdy oak (Quercus sp.), monarch of the forest in the Northern Hemisphere and the largest member of the beech family was the most sacred tree of all to the Greeks, Romans, Teutons or Gauls, and Britons. The Greeks and Romans held the oak as sacred to Zeus or Jupiter — God of the Heavens — and considered it the first tree to grow on earth. The oak, since it was more often struck by lightning than any other, was Zeus' own special tree. The Talking Oak of Zeus at Dodonia delivered messages concerning the future, and a piece of it built into the prow of the mythical ship Argo, guided Jason and his Greek heroes on their perilous journey to the Black Sea in search of the Golden Fleece. To the Roman soldier no greater honor was obtainable than a civic crown of oak leaves.

Since Abraham — according to Genesis 18 — entertained God Himself under the Oak at Mamre, Hebron, early Hebrews worshiped it and built altars under the supposed Abraham's Oak, which were later destroyed and replaced with a church by Constantine. Many other references are made to the oak in the Old Testament, some claiming Saul was buried under an oak in the Valley of Jabesh.

The Prussians of olden days had a special sacred oak at Remowe, in which the idols of the gods were kept, screened from profane gaze. Here, before the idol of Perkunas — God of Thunder — burned a perpetual fire of oak. The Russians also kept a sacred fire of oak burning before an idol of the same God — Perun — at Novgorod, with death as the penalty for any priest who might carelessly allow the fire to die. The Elbe Slavs as well as the Russians had an oak grove near Lubeck consecrated to the Gods, guarded by a wooden fence and full of idols in whose honor feasts and sacrifices were made. Anyone under sentence of death concealing himself there was safe from harm as he was under the special protection of the gods themselves. Some Finnish tribes such as the Erza Mordvins, turned toward the oak as they prayed for rain, and hung their offerings of food on branches of this tree.

The ancient Celts or Britons held the sturdy oak in greater esteem than any other tree. Under its consecrated shade the Druids held their most solemn rites. The misletoe which grew on the sacred oak was gathered as the old year waned by the Druid priests with a hook of gold, and presented to Jupiter. Their sacred fires were always of oak, as well as their Yule logs which were burned as a sacrifice to Yaioul, Celtic God of Fire, for it was through his favor that winter storms were abated and spring made possible.

Even the American Indians had their mythical or sacred oaks, and their celebrated Celestial Sudatory was made of oak trees with flowers binding them together. The Japanese, too, had a giant

mythical oak which cast its shadow over the islands for hundreds of miles. Traces of this ancient worship of trees still linger in Armenia today where oaks in particular, especially those near a spring, are sacred and on which the sick still hang pieces of their clothing in solemn hopes of a cure. The ashes from the sacred fire of oak also furnishes them a potent medicine. All parts of Palestine, too, have their sacred oaks. The most famous one, growing near the shrine of Badariya is still visited and considered holy by Christians and Moslems alike regardless of disapproval by their leaders.

Down through the ages the oak has been a symbol of strength and durability. Its name appears in literature and songs of all seafaring races, and Vergil, the Roman poet, writing before Christ, called the oak "Jove's own tree, that holds the woods in awful sovereignty." Historic oaks are found in almost every nation, but especially in Britain, where the oak "mothered" her ships upon which her very existence depended. The Norsemen's ships, too, had "Hearts of Oak," and the galley boats of ancient Greece and Rome were timbered with it, while our own historical "Old Ironsides" was built of the American variety. The wood of all oaks is noted for its toughness and hardness, although that of some is comparatively soft and worthless except as fuel. The oak ranges in size from a tiny shrub to the monarch of the forest, probably reaching its greatest height in Costa Rica, where trees 120 feet or more in height are common, with clear lengths of 80 feet. The Wye Oak, a white oak (Quercus alba), at Wye Mills, Maryland, is the largest of its kind in America, with a trunk diameter at breast height over 8 feet, 95 feet tall, and with a limb spread of 165 feet. Its estimated age of 400 years is young compared to English and European specimens of at least 1000 years recorded history.

The present range of this tree of ancient lineage is from the north temperate zone south into the tropics of the Indian Archipelago in the Old World and to the mountains of Columbia and Ecuador in the New. Of the 500 or more known species, a greater number than any other tree group, my collection numbers 50 samples from thirteen separate areas of the globe, from America to the Isle of Cyprus and faraway Formosa. Most oaks are divided into two large groups, namely the White Oaks and the Black Oaks, the former producing acorns each year while the latter requires usually two years, and sometimes three, for maturing. The acorns furnished food for swine and humans in ages past and even today among primitive peoples. Some oaks yield tan bark of the finest quality, others are the source of dyes, ink, and medicinal products. The Cork Oak of Portugal, Spain, and northern Africa yields bark which furnishes commercial cork. The wood of oak has been used since prehistoric times for fuel, building construction, and ships, and today for additional purposes where strength and durability are important, such as flooring, fine furniture, bridges, caskets, and cooperage. Perhaps the oldest use was in an unearthed Stone Age dwelling at Ipswich, England, apparently built some 50,000 years ago.

The Sturdy Oak, even yet, holds much of its claim for reverence. Our great cathedrals in Europe and America, houses of worship, sacred places as were the sacred groves of the Druids are timbered with carved oak. In our recent world conflict many fighting craft were once again with "Hearts of Oak." And also, in Tallahassee, Florida, a mighty Live Oak still stands, under whose outstretched limbs the May Day Queen has been crowned since 1835.

ARCHITECTURAL TERMS

N. M. PITTMAN
Leveretts Chappel High School
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ALCOVE — A large recess in a room, usually separated by an arch.

APRON — A piece of finish trim below stool of window.

ARCH — Arrangement of building materials in a curved form and designed to carry weight.

AXIS — An imaginary line through the center of a sphere.

BALLOON FRAMING — A system of framing in which corner posts and studs are in one piece from sill to roof plate, intermediate joists being carried by girts spiked to the studs.

BALUSTER — A column supporting a rail.

BALUSTRADE — A number of balusters, or columns supporting a rail.

BATTEN — Small strips of boards, used over joints of sheathing for weather stripping.

BAY — The space within a building between two adjacent rows of columns.

BAY WINDOW — A window projecting outward from wall of a building.

BEAM — A horizontal member supporting a load over an opening, or from column to column.

BEARING — The portion of a beam that rests on supports.

BEARING WALL OR PARTITION — A wall supporting any load other than its own weight.

BED — The horizontal surfaces in masonry on which stones or brick lie in courses.

BELT — A course of stones or brick projecting from a wall, usually placed in line with the window sills.

BEVEL — An instrument for taking angles.

BOND — The connection between bricks or stone formed by lapping them upon one another, forming an inseparable mass.

BRACE — A piece of lumber, or other material used in framing to form a triangle, thereby stiffening the structure.

BREAK — A projection from the building surface.

BRIDGING — Method of stiffing floor joists and studs, by inserting members in between.

BUTT JOINT — Where two ends come together.

CASEMENT — A glass frame hinged on its vertical edges.

COFFER — A deep panel in a ceiling.

COLLAR BEAM — A beam above the lower ends of the rafters and spiked to them.

COLONNADE — A row of columns.

COLUMN — A round pillar.

COPING — The capping or covering of a wall.

CORBEL — A piece of stone or timber jutting out of a wall to carry weight.

CORNICE — The projection at the top of a wall finished by a blocking course.

COURSE — A continued layer of brick, stone, slate, shingles, etc.

COVE CEILING — A ceiling curving from the walls.

CURB ROOF — A roof formed of four continuous planes, each two having an external slope.

CURTAIN WALL — A nonbearing wall between columns, and not supported by beams or girders.

DOOR FRAME — The frame into which the door fits; it consists of two upright members called jambs, and a head.

DORMER WINDOW — A window in a sloping roof, forming a gutter on each side.

DOVETAILING — Fastening boards together, by letting one piece into another as the expanded tail of a dove.

DOWEL — A pin for fastening wood or stone. A piece of wood driven into a wall, so other members may be fastened to it.

EAVES — The lower part of a slanting overhang, such as a roof projecting over a wall.

FAÇADE — The principal front of a building.

FLASHINGS — Metal strips let into joints of wall or any rising part so as to prevent leaking.

FOOTINGS — The foundation on which bearing wall or columns rest.

FOUNDATION — The part of a building below grade (ground).

FRAMING — The rough house frame, walls, roofing, joists, etc.

FURRING — Narrow strips of lumber fas-

tened to walls and ceilings to form surface for applying paneling, etc.

GIRDER — A large beam for supporting joists or walls over an opening.

GROUNDS — Pieces of wood embedded in plaster walls to which baseboard and other material is attached. Also used as a plaster stop around doors and windows.

GROUT — Thinned mortar used to fill joints in masonry.

HEADERS — Stones or brick extending over thickness of wall. Wood beams into which joists are framed, such as for framing openings around stairs.

HEADWAY — Clear space under arch, or over stairway.

HIP ROOF — A roof rising by equally inclined planes from all four sides of the building.

JAMB — Side pieces of openings.

JOIST — Timbers to which floor boards are nailed or ceiling lath fastened. Joists rest on wall or girders.

LATH — A strip used in tiling, plastering, etc.

LATTICE — A network of strips of material, generally used as a screen.

LEDGE — A projection from a plane.

LINTEL — A horizontal member covering the opening of a door or window.

LOUVER — An opening with slats, for ventilation.

MANSARD ROOF — See *Curb roof*.

MASONRY — Brick, hollow tile, concrete block, stone, concrete, and other similar material, bonded together with mortar to form a unit.

MEETING RAIL — Where the top and bottom sash meet in a double-hung window. Also known as check rail.

MILLWORK — Material usually obtained from a planing mill, such as door and window frames, doors, sash, panels, etc.

MORTISE — Any hole cut into or through a piece, usually rectangular in shape.

MULLION — The members between lights of windows or screen work.

MUNTIN — A small mullion in light framing, such as a middle stile of a door.

NEWELL POST — Post at the lowest step of a staircase, receiving start of handrail.

NOSINGS — Projecting edges of treads of stairs, or the edge of a landing.

PARAPET — Wall along edge of roof, around a terrace walk.

PARGING — Thin coat of plastering to smooth off rough brick or stone walls.

PARTY WALLS — Partitions of buildings erected on a line separating two pieces of land that is owned by two parties.

PENT ROOF — A roof with a slope on one side only.

PITCH OF ROOF — Proportion obtained by dividing the height by the span.

PURLINS — Members which support the rafters to prevent them from sinking.

RAFTERS — Members to which roof decking is nailed.

RAKE — The trim of a building extending in an inclined line.

RAMP — An inclined passage connecting different levels.

RIDGE — The top of a roof which rises to an acute angle.

RIDGE POLE — The highest horizontal member in a roof for supporting heads of rafters.

RISER — The vertical board under the tread in a stair.

SASH — The framework that holds glass in a window.

SCRATCH COAT — The first coat of plaster, which is applied rough to afford a bond for the second coat.

SCRIBING — Fitting woodwork to an irregular surface.

SHED ROOF — A roof with only one set of rafters, falling from a higher to a lower wall.

SILLS — The timbers on the foundation which support the superstructure. Also applied to members at bottom of doors, windows.

SLEEPER — Wood timber laid on foundation to receive floor joists.

SOFFIT — The lower horizontal face, as under face of a beam or roof overhang.

SPAN — Distance between supports of a beam, girder, etc.

SPANDREL — The space between any arch and the level beams over same.

STILE — The upright piece in framing or paneling.

STUDS — The upright members used in partitions and walls to which the sheathing is applied.

TREAD — The horizontal part of a stair or step.

TO THE WEATHER — The projection of siding or shingles beyond the course above.

TRIM — Materials such as moldings, baseboards, window and door framing, etc., in a room.

TRIMMER — The beam or floor joist into which a header is framed.

VALLEY — The internal angle formed by two inclined sides of a roof.

VENEER — Thin sheets of wood.

VENT — An installation for the flow of air.

VESTIBULE — A small enclosed space at the entrance to a building.

WAINSCOTING — Covering of lower portion of wall.

WALL, BEARING — A wall that supports a load in addition to its own weight

WALLBOARD — Wood pulp, gypsum, etc., made in large sheets for wall coverage.

WATER TABLE — The small board projecting from bottom of the exterior wall that drains water away from the foundation.

WEEPHOLE — Small hole in masonry to drain moisture to the outside.

WIRE GLASS — Glass having a layer of meshed wire cast in the center of it.

SHOP SAFETY POSTERS

BROTHER LEO GEIGER, C.S.C.
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Safety is one factor every shop instructor strives to instill into his students. One method for impressing some of the safety rules is to have each student make a safety poster as an out-of-class project. The posters can be printed slogans, rules for proper operation of the machines, or safe methods for using the various hand tools. Any subject which attracts attention to a hazard or a possible tragedy could be included.

A contest can be conducted with emphasis being placed on originality, neatness, and practicality. Students can use pictures or cartoons to illustrate their posters, thus adding an extra psychological appeal.

The shop instructor can set the rules to be followed in the poster construction so that the size of all are uniform. Grades can also be given for these posters just as a regular shop project or a test.

This safety poster idea not only has the advantage of instilling safety consciousness into the students who make the posters, but also supplies the instructor with posters for making future classes safety conscious. Over a period of time, a shop instructor can accumulate a regular file of safety posters that can be used throughout the school year.

The creation of NATO did not violate any principles of the United Nations, whose constitution expressly provides for such defensive agreements among its members. Nor did it mean that the U. S. was sacrificing any of its national sovereignty — NATO is not a "superstate" and its members retain all their individual freedoms. — *Wisconsin Military District Information Office.*

If treads on stairs are showing traffic wear, clean the worn spots and apply a thinned coat of pure, white shellac. When dry, brush on another shellac coat for added protection. — *Shellac Information Bureau.*

A farmer driving a petroleum-powered tractor can plow more than 60 acres of wheat land a day — this compares with 16 acres for the man driving a six-mule team back in 1941. — *Petroleum Newsnotes.*

B-G presents A New Idea for mechanical drawing class arrangement

SERVICE UNITS + TUBULAR DRAWING TABLES

Using a basic, low-priced drawing table, in combination with separate storage units, makes possible the greatest versatility!

EACH student is assigned a drawer and drawing board. At the beginning of his class he removes these from the storage units, and places them into use at his table. At the end of his class, he returns the drawer and board to the storage unit, and the table is ready for use by the next class. You are not limited to 4-drawer case units; it is possible to add single drawers as needed.

SERVICE UNITS

No. TD 12, complete $220.70

Drawing board cabinet is 16" wide x 22" deep x 30" high. Sturdily constructed. Includes handle and lock. Separators allow for storage of 12 drawing boards up to 20" x 26". Drawer pedestal units are made of individual stacking drawer case units. This allows for additional flexibility in that a variety of combinations are possible. Each drawer is 14" x 20" x 5", and is equipped with master-keyed cylinder lock.

TUBULAR DRAWING TABLE

No. TD 1, with Drawer Slide, each, $66.50

Top is 42" x 30" x ¾" thick, and constructed of Vibrex board finished in tough, smooth gray enamel. Vibrex is a plastic hard board material which will not deteriorate or warp under severe moisture or temperature conditions. Top is permanently fixed at a scientifically determined angle with a height at front of 37" and at back of 41¼", and is fitted with pencil ledge at front.

BRODHEAD-GARRETT CO. 4560 East 71 St., Cleveland 5, Ohio

Lumber, Industrial Arts, Vocational Education Machinery and Equipment

ASSOCIATION NEWS

(Continued from page 6A)

Richard Froese, vice-president; Len Banach, treasurer; Bernard Wray, secretary; Ralph Rogers, program chairman; and Dave Wray, past president.

In addition to dinner and music there was a program to honor members and to show the high lights of the past 25 years.

At its monthly meetings this year the association has visited new schools in the county as well as industrial visits to the General Precision Laboratories in Pleasantville and Lester Associates, Model Makers in Hastings-on-Hudson, N. Y.

Programs for the evening were presented by Norman Ceramics; Reed McIntyre, safety director of Anaconda Copper; Bob Bielefield from the Bureau of Industrial Arts Education; Homosote Corporation; Logan Lathe; and a joint meeting with the Long Island Industrial Arts Club.

At the Annual May meeting of the Westchester Teachers' Association in White Plains, N. Y., the W.I.A. & V.E.A. will exhibit projects made by shop students in the county. — *Richard A. Froese, vice-president.*

N. E. OHIO INDUSTRIAL ARTS ASSOCIATION

The annual winter meeting of the Northeastern Ohio Industrial Arts Association was held at Kent State University on Wednesday, February 5, 1958. As in the past the Industrial Arts Department was the host and arranged for the program.

Prof. Frank A. Marschik was the general chairman.

Registration and checking was done by the student members of Epsilon Pi Tau. The coffee hour hosts were members of the Industrial Arts Club.

This year's meeting was designated "Administration Night." Some forty superintendents, principals, and supervisors attended.

The feature of the meeting was a banquet attended by 249.

Dr. Henry Herrmann, associate professor of graduate education, Wayne State University, Detroit, Mich., spoke on "Arts and Industry — Their Challenge to Education."

Following the dinner program members and guests visited Van Deusen Hall, where shop demonstrations, project displays, and commercial exhibitors provided a full evening's program.

NATIONAL ELECTRONICS CONFERENCE

The National Electronics Conference, the nation's leading forum on electronic research, development, and application, will hold their 1958 meeting at the Hotel Sherman, Chicago, Ill., on October 13 to 15.

Joseph H. Enenbach, supervising engineer at the Illinois Bell Telephone Company, has been elected president. Other officers named for the 1958 Conference are: executive vice-president, Milton H. Crothers, University of Illinois; secretary, Charles W. McMullen, Northwestern University; treasurer, James H. Kogen, Askania Regulator Company; executive secretary, Robert E. Bard, General Radio Company; and assistant treasurer, Gordon J. Argall, DeVry Technical Institute.

Held annually in Chicago since 1944, the Conference is sponsored by the American Institute of Electrical Engineers, the Illinois Institute of Technology, the Institute of Radio Engineers, Northwestern and Illinois Universities. Participants are Notre Dame, Purdue, Michigan State, Wayne State, and Wisconsin Universities, Electronic Industries Association, and the Society of Motion Picture and Television Engineers.

It is expected that in 1958, a year of increasing importance to electronics, the Conference will be attended by 10,000 persons — mostly scientists, engineers, educators, manufacturers, government officials, and students.

NEW OFFICERS ELECTED

The New Jersey Vocational and Arts Association, at its recent convention, elected the following officers to serve the fiscal year 1958–1959: president, Dr. Philip Haney, assistant director, Essex County Vocational and Technical High Schools; first vice-president, Mrs. Florence Heal, supervisor of home economics, High School, Moorestown; second vice-president, Leonard Skolnick, teacher of industrial arts, Newark; third vice-president, Willard Vroom, teacher of graphic arts, Trenton Vocational and Technical High School; treasurer, Edmund A. Boyer, Jr., teacher of industrial arts, High School, Merchantville; secretary, Richard O. Harthmann, assistant supervisor, industrial arts, Jersey City, N. J.

It was decided that the next convention of this group, the forty-first, will be held at the Hotel Berkeley-Carteret, Asbury Park, N. J., on March 19 to 21, 1959.

— *Richard O. Harthmann, secretary.*

Personal News

HOMER C. ROSE PROMOTED

Homer C. Rose, Class of 1931, has recently been promoted to the rank of Commander, U. S. Naval Reserve.

He has charge of a unit of the Naval Reserve Officers School program in Washington, D. C.

Homer C. Rose

In civilian life, Mr. Rose is Chief, Proficiency Development Division, Civil Aeronautics Administration.

CAA works for safe aircraft, safe airports, and safe airways in the United States and around the world. The organization has over 24,000 employees of which about 10,000 are air traffic controllers. The Proficiency Development Division, under Mr. Rose, is responsible for management and supervisory training programs, instructor training and other staff assistance, personnel performance evaluation, general skills training, and the evaluation of the total CAA training program.

DR. WIGEN AND DR. SWANSON RECEIVE AWARDS

Two of the five national research awards of the American Technical Society have been made to faculty members of Stout State College, Menomonie, Wis. The men chosen are Dr. Ray A. Wigen, director of graduate studies at Stout, and Dr. Robert S. Swanson, associate professor of industrial education.

Each received a $200 cash award from the American Technical Society, plus national recognition as an "Oscar" winner in the field of industrial education research. Aims of the awards program are improved educational practices, provide new educational knowledge and stimulate other educators to excellent research.

The five men recognized for their achievements were selected from among eligible educators throughout the nation, not only in the field of industrial education but also in 11 such areas as agriculture, business, guidance, and similar endeavors.

Both Dr. Wigen and Dr. Swanson completed their Ph.D. research at the University of Minnesota under the direction of that institution's chairman of industrial arts, Dr. William Micheels, himself a Stout graduate. The awards program was also approved by the Research and Executive committees of the American Vocational Association.

BERNARD R. JOSIF IN NEW POSITION

On December 1, 1957, Bernard R. Josif announced his resignation from the staff of the Industrial Arts Department, Ball State Teachers College, Muncie, Ind. He has temporarily retired from the teaching profession for a period of two years to accept an assignment as the executive assistant to the vice-president of the Consolidated Book Publishing Company, Chicago, Ill.

Working under the general direction of the vice-president he will serve as a technical consultant on graphic arts problems, contacting the executive and training departments of industrial organizations and in addition, will be responsible for the hiring and training of field staff.

Before coming to Muncie, Professor Josif was chairman of the Department of Industrial Arts and Vocational Education at Pfeiffer College in North Carolina. His B.S. and M.S. degrees were obtained from Miami University, Oxford, Ohio, and he has a year's additional study at Northwestern University and is presently working toward an advanced degree from Indiana University.

He is a member of the American Industrial Arts Association, Indiana Industrial Education Association, American Society of Training Directors, Epsilon Pi Tau and Phi Delta Kappa, professional honoraries.

KENNETH L. SCHANK IN NEW POSITION

Kenneth L. Schank, secretary-treasurer of the Wisconsin Industrial Arts Association, and a teacher in the Racine, Wis., public school system since 1949, was recently elected to the position of consultant of practical arts for the board of education at Racine, to succeed Harlan J. Shufelt, who is retiring at the end of this school year.

Mr. Schank was born in Milwaukee and was graduated from West Milwaukee High School in 1939. After spending some time at West Allis Vocational School, and working in industry, he served in the U. S. Navy during World War II, serving principally in the South Pacific and at the Great Lakes Naval Training Station where he taught in the Service School.

He was graduated from the Stout State College, Menomonie, Wis., in 1949 with a B.S. degree, and is a member of Epsilon Pi Tau and other fraternities. He was elected to Who's Who in American Colleges and Universities in 1949. In June, 1953, he received

(Continued on page 24A)

How to make your A-V budget buy MORE PROJECTORS

The new Kodak Pageant Sound Projector, Model AV-085, is a 1958 machine that rolls prices back to 1955 levels. It lists for only $439!*

In simple terms, it means you can buy *more 16mm sound projectors* on a given budget without sacrificing picture or sound quality. Or, pay less for a single machine and have money left over for other purposes.

Many "high-priced" features—The AV-085 is a first-line machine in every sense. Sound reproduction is clear, natural, resonant. The exclusive Kodak Super-40 Shutter provides a brilliant screen image that's sharp from edge to edge. Its operating quietness makes it an ideal projector for classroom and small-room shows.

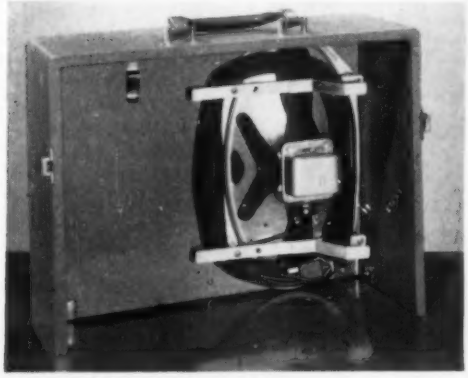
Ask your Kodak audio-visual dealer to demonstrate the new Kodak Pageant AV-085 soon. Even if you don't plan to invest in more projectors immediately, it's a machine you should know about.

Meanwhile, the pictures and captions show some of the many reasons why the AV-085 is a remarkable buy. And Bulletin *V3-22*, yours for the writing, gives full details. No obligation, of course.

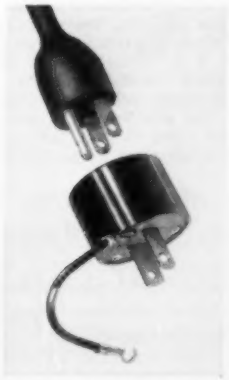
**List price subject to change without notice.*

EASTMAN KODAK COMPANY
Dept. 8-V, Rochester 4, N. Y.

1. More projectors for your A-V dollars. New Pageant Sound Projector, Model AV-085, is budget-priced, yet has regular Pageant features: folding reel arms, attached belts, Kodak Super-40 Shutter for brilliant screen image, takes 750 or 1000-watt lamps.



2. Natural sound, good bass response with new 11-inch oval speaker in baffled enclosure. The Pageant's powerful, sensitive 8-watt amplifier provides clear, resonant sound reproduction.



3. To meet all electrical codes, AV-085 has new 3-wire power cord, adapter for 2-wire outlets.

4. All Pageants are lubricated for life to insure long, trouble-free operation. Another long-life feature is the virtually wearproof pulldown tooth of tungsten carbide.

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TOOLS
Develop Better
Craftsmanship

Production-quality Greenlee boring, mortising and routing tools retain safe, sharp cutting edges longer . . . give your students top-notch results you can be proud of. It's a comfort to know your shop is a safer place for students, too. Machines work efficiently . . . produce clean, splinter-free work. Cut replacement costs! Specify Greenlee . . . better tools to develop better craftsmanship.

WRITE FOR CATALOG 34-M

You'll find it crammed with useful information for ordering Greenlee tools.

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ROCKFORD, ILLINOIS

PERSONAL NEWS

(Continued from page 22A)

his M.S. degree from Bradley University, and has continued with doctoral work at Wayne State University and at the University of Maryland.

Since 1949, Mr. Schank has been teaching in Racine at the Washington Junior High School, and at the Racine Vocational and Adult School.

In addition to his present office of secretary-treasurer of the Wisconsin Industrial Arts Association, he has served on panels and committees for state and national associations. He has been a member of city-wide curriculum study groups, report card revision committees, and in-service training programs.

Mr. Schank is also co-author of a shop electricity book soon to be published.

TEN STUDENTS INITIATED

Ten initiates became members of Phi Chapter, Epsilon Pi Tau's chapter at State University Teachers College, Oswego, N. Y., at an initiation banquet on Sunday evening, March 16, 1958, at Hotel Pontiac, Oswego.

The banquet was attended by 85 members and guests of the international honor fraternity of industrial arts education.

The initiates included Rocco D. Acquilano, Geneva; William R. Groves, Lacona; Brenon P. Caton, Spencerport; Lowell E. Hellard, Minetto; Roger Chapin, Roselle, N. J.; James W. Hesselgrave, Oswego; Victor H. Degni, Utica; Myron E. Lewis, Jr., Sandy Creek; Robert Dilger, Bergen; and Samuel W. Somerville, Glens Falls.

Dr. Joseph R. Strobel, assistant commissioner for industrial services, New York State Education Department, spoke on "Some Engineering Developments in Industrial Education."

Guests of Phi Chapter at the banquet included Dr. Foster S. Brown, president of the Oswego College, and Mrs. Brown; Dr. Charles F. Wells, chairman of the college's English department, and Mrs. Wells.

The officers of the chapter are Reed Tinkler, president; Richard Wingate, vice-president; Milton Fridley, treasurer; Roger Goodman, secretary; and Robert D. Helsby and Paul T. Hiser, trustees.

♦ Harry A. Goldstein, B.A., M.A., A.P.S.A., instructor of photography at Tucson High School, Tucson, Ariz., presented his views in the opening conference of the Tenth Annual Industrial Arts Teachers Conference of Texas, which convened on the campus of Texas A. & M. College, College Station, Tex., on February 21 and 22, 1958.

Mr. Goldstein talked on "Visual Aids and Atoms: The new Polaroid system of making black and white slides in just a few minutes and its implications in education."

NATO is not only a military alliance but it contributes toward the further development of peaceful and friendly international relations by strengthening their free institutions, by bringing about a better understanding upon which these institutions were founded, and by promoting conditions of stability and well-being. — *Wisconsin Military District Information Office.*

FREE

New 1958
SCHOOL SHOP
LUMBER CATALOG

You'll find our new School Shop Lumber Catalog helpful!

In its 36 pages are illustrations and text covering 16 species of woods regularly used in School Shops; information on drawing boards, dowels, turning squares and plywoods—and *two illustrated pages featuring water ski equipment!*

Catalog lists Delivered Prices for cities east of the Mississippi; f.o.b. prices to points west of the Mississippi. Where possible, we make direct mill-to-school delivery via truck transport.

Remember! *Better lumber* will give *better results!* That is the kind of lumber we manufacture and ship—properly kiln-dried Appalachian Hardwoods, correct as to grade and dryness. It works easier, works better—is more economical to use!

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EDUCATIONAL LUMBER DIVISION
P. O. Drawer 1091, Asheville, N. C.

News Notes

MANHATTAN GUILD MEETING

The Manhattan Guild Meeting on February 20, 1958, was held at the Simon Baruch Junior High School No. 104, located near Stuyvesant town.

The first part of the evening was given to visiting the five industrial arts shops in the building, to hear about the shop program offered, and to study the shop construction.

Mr. Segal, a well-known silversmith and craftsman, presented a talk, with slides, and showed various gems and stones in striking color. In another series of slides he showed how various stones are fashioned into jewelry utilizing silver both as a decorative and functional part of the design.

Mr. Rubinstein, who arranged this program, played a tape record of a message received from an industrial-arts instructor from another part of the country.

Refreshments were served, and a short business meeting was then held. The next meeting of the guild will be held on April 24, 1958, at Junior High School, No. 54, Manhattan.

SIXTH ANNUAL EASTERN CERAMIC HOBBY SHOW

At the 6th Annual Ceramic Hobby Show, to be conducted at Asbury Park, N. J., May 8 through May 11, 1958, special classes will be held each morning before the opening of the show. Studio owners and hobbyists attending the show, will have an opportunity to study under a number of celebrated teachers. A partial list of teachers who will conduct classes includes Dick Balash, Alice Hill, Lucille Henderson, Lillian Kappeler, Isabel Podeszwa, Chas. West, Belva Woolsey, and Strangren of Trenton, N. J. Others are expected to accept the League's invitation to teach.

Those desiring to enroll in any of the classes by these outstanding teachers, should contact *Mrs. Christine Casey, 17 Bridge St., Chatham, N. J.*

This year Ceramic Leagues Inc., will resume publication of an arts program in connection with the show. Again it will contain much valuable information, and besides its text book-like references, will also make a wonderful souvenir of the show.

Further information may be had by writing to *Leah Mansmann, 108 Gainsboro Rd., Trenton, N. J.*

STOUT PARTICIPATES IN INTERINSTITUTIONAL PROJECT

Stout State College, Menomonie, Wis., is one of 10 colleges and universities in the nation named to the Interinstitutional Affiliation Project of the American Association of Colleges for Teacher Education. Stout has been awarded a $1,000 grant to carry on a co-operative educational project with Cebu School of Arts and Trade in the Philippine Islands.

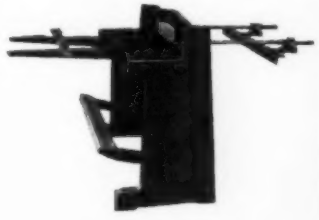
The aim of the over-all AACTE project being carried on simultaneously in a number of parts of the world, is to achieve better international relationships and understanding by providing current American instructional materials to countries engaged in improving their educational programs. Such nations will, in return, furnish American educators with descriptions of specific educational techniques prevalent in these nations and with useful cultural data.

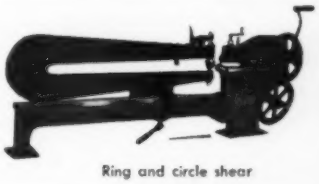
(Continued on next page)

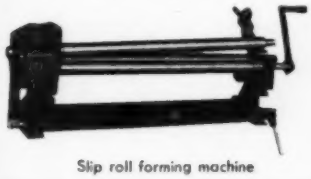
PEXTO SHEET METAL MACHINERY

and hand tools . . . the ideal choice for school shops everywhere. PEXTO means dependability and long life performance for the student and the skilled sheet metal craftsman.

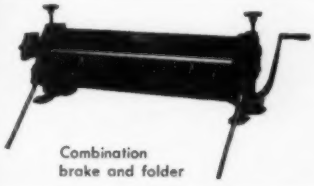
Free to school shop instructors, a valuable School Shop Manual, containing ideas on methods and time-saving aids and an easy reference guide to the selection of school shop sheet metal sheet working equipment. Ask for Bulletin No. S-36.


Foot squaring shear


Ring and circle shear


Slip roll forming machine

Adjustable bar folder


Combination brake and folder

Double seaming machine

Combination rotary machine

also . . .

A Complete Line of HAND TOOLS and STAKES

THE PECK, STOW & WILCOX CO. Southington, Conn. U. S. A.

A complete line of machines and tools for Sheet Metal Fabrication.

NEWS NOTES

(Continued from previous page)

The instructional materials in technical education which Stout State College could furnish were especially in demand by nations which are attempting to increase their industrialization by providing to their citizens vocational education, not only the classical learning offered almost exclusively in schools of European origin. This is the first year that such an AACTE interinstitutional project has been attempted.

Project co-ordinator at the Cebu School is to be Ricardo P. Trinidad, superintendent of that educational institution. Serving in the same capacity for Stout State College will be Dr. Ray A. Wigen, director of the graduate studies program. Working with Dr. Wigen at Stout, under the direction of President Verne C. Fryklund, are Dr. John A. Jarvis, dean of industrial education; Dr. G. S. Wall, who is serving as committee secretary; and Dr. D. P. Barnard, Dwight D. Chinnock, Floyd Keith, Dr. J. E. Ray, Philip W. Ruehl, Dr. Robert Swanson, Lloyd Whydotski, and Dr. E. Robert Rudiger.

AFS FOUNDRY SHOW TO BE HELD

The American Foundrymen's Society Castings Congress and Foundry Show will be held in Cleveland, Ohio, on May 19 to 23, 1958. Hundreds of exhibits will serve to demonstrate the latest machines, the newest techniques, for meeting the basic industrial demands of Design and Materials Engineers in their use of metals.

Beginning with patternmaking, the show will unfold all of the latest developments in fundamental foundry operation. Sand, the industry's most basic material, will form the basis for more exhibits than ever before. Included will be operating sand reclamation units, conveyors, vibrators, driers, mullers, and mixers. Complete sand handling systems for both large and small foundries will be on display.

Exhibits relating to sand handling, conditioning, and usage will range from machines to materials and supplies — binders to coatings. These diversified exhibits will cover every phase and type of metal casting production, enabling visitors to not only see but to compare the offerings for their own production requirements.

Advance registrations indicate an international attendance well over the 15,000 total.

INDUSTRIAL PHOTOGRAPHIC MANAGEMENT COURSE

Industrial management personnel for the first time this year will invade the halls of the Winona School of Photography, conducted in the spring and summer at Winona Lake, Ind., by the Professional Photographers of America, Inc. This is the national association of professional photographers.

An intensive one-week, full-time course, "Industrial Photographic Management," will be presented August 25 to 29, 1958, at the school. The institution has become well known for its advanced instruction in portrait and commercial photography.

The industrial course will be taught by leading photographer-executives. The course is described as being of especial interest to those in the management of photographic plants.

A new illustrated brochure, "Winona '58," describes this and other courses. It is available from the *Professional Photographers of America, Inc.* (formerly Photographers Association of America), *152 West Wisconsin Ave., Milwaukee 3, Wis.*

NEW FILM ON PRINTING INDUSTRY CAREER OPPORTUNITIES

"Printing — A Future Unlimited" is the first motion picture to be produced by the graphic arts industry to tell young people about its vocational and career opportunities. In premiere showings in over 20 cities throughout the United States to high school audiences during the week of January 13, it was applauded for its technical perfection, interesting story, and understanding of the interests of young people in thinking about their future.

The film was produced by the Education Council of the Graphic Arts Industry with the assistance and advice of a group of educators, guidance counselors, printing teachers, and printers. Chairman of the committee was Irl Korsen (Eureka Press, Inc., Los Angeles). In charge of the entire production was Sherman Rifkin (Los Angeles), who is a member of the instructional staff of the University of California. A feature of the movie is the commentary by Howard Duff, a favorite movie and television actor of the teen-age set.

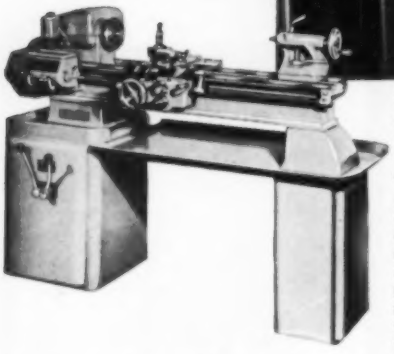
While a number of scenes are laid in printing plants, the film emphasizes the fact that the printing industry is made up of hard-working people who have learned their jobs by taking advantage of the educational and training opportunities afforded them in high schools, vocational schools, colleges and on-the-job.

School officials interested in purchasing the film may request its review by writing to the: *Education Council of the Graphic Arts Industry, 5728 Connecticut Avenue, N.W., Washington 15, D. C.*

(Continued on page 28A)

SHELDON *Builder of Sheldon Lathes, Milling Machines, Shapers and Sebastian Lathes*

It only takes one good Milling Machine and a capable Shaper to triple the value of your shop course



No course in shop practice can be complete without basic instruction on the milling machine and the shaper.

For this no other units equal the size "0" Sheldon Milling Machine with its hand and power table feed, quick-change gear box, variable speed drive, back geared unit, and interchangeable vertical milling head attachment. No other shaper is better suited for class work than the ample size Sheldon 12" Back Geared Shaper with its large capacity, long stroke, variable speed drive, weight and accuracy.

These are standard machine tools with which you can teach modern methods and tool performance—— full powered industrial tools that can give your students the "feel" experience and satisfaction of adult work.

Sheldon provides today's modern school shop with "up-to-date" machine tools . . . with 10", 11", and 13" Precision lathes for both industrial arts and vocational programs . . . Sheldon Milling Machines . . . Sheldon Shapers . . . and, for advanced courses, Sebastian 13" and 15" Geared Head Lathes.

BASIC TEACHING AIDS

In addition to providing conveniently located distributors with experienced sales engineers, Sheldon prepares and publishes basic teaching aids, for shop instructors.

Write for samples today——

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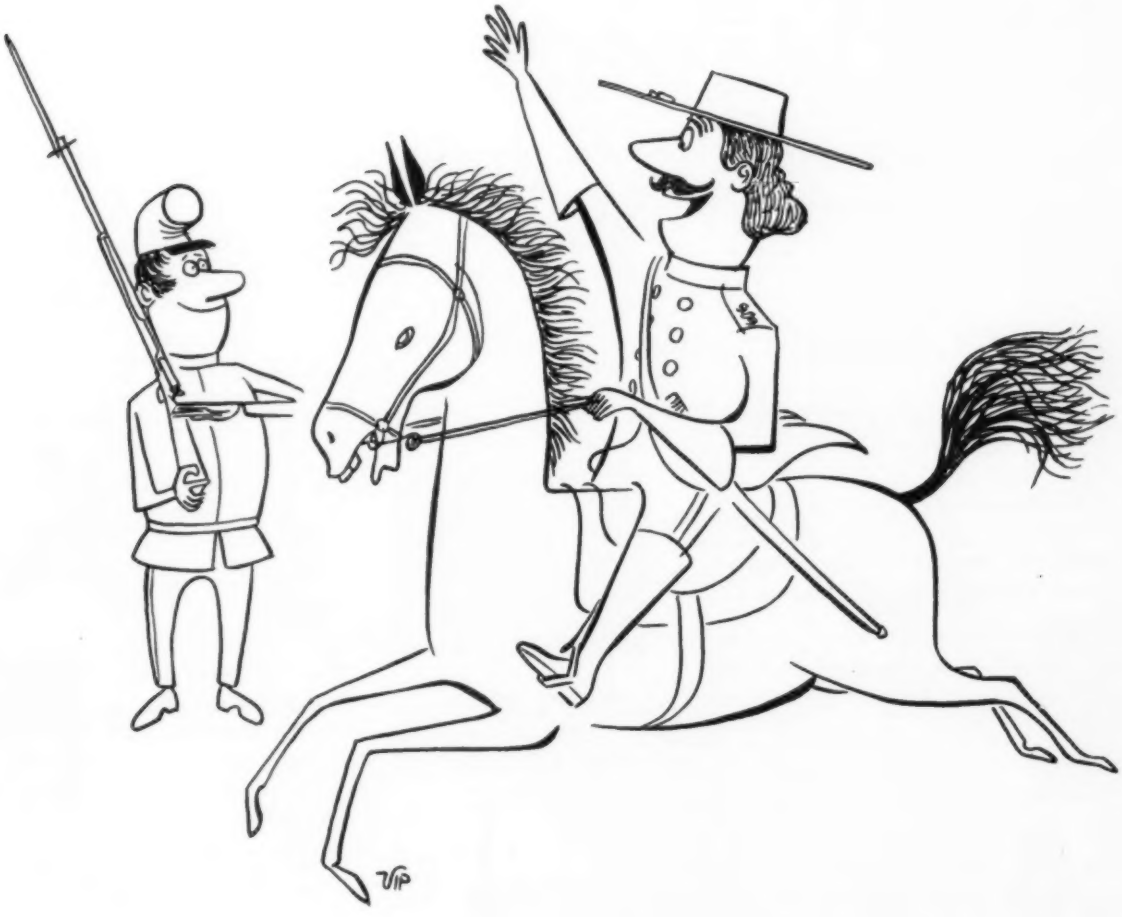

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In the famous words of General Nathaniel Bedford Forrest, K&E *does* "git there fustest" with a complete line of the highest quality equipment and materials for engineers and students.

Just name it! Drawing instruments, lettering sets, slide rules, drawing and tracing papers, graph sheets, drawing boards, scales, triangles, protractors, curves, T-squares, measuring tapes.

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NEWS NOTES

(Continued from page 26A)

AMERICAN FOUNDRYMEN'S SOCIETY NAMES NINE FOR 1958 AWARDS

According to announcement by the Board of Awards of the American Foundrymen's Society, nine leaders in the Castings Industry have been selected to receive AFS Awards in 1958. The awards will be made in Cleveland as part of the program connected with the 62nd AFS Castings Congress and the AFS Foundry Show, to be staged simultaneously for five days, May 19–23.

The three men chosen to receive gold medals, the topmost awards conferred by the American Foundrymen's Society of Des Plaines, Ill., international technical society of the metal castings industry, are:

Ralph A. Clark, Manager of Foundry Service, Electro Metallurgical Co., Div. of Union Carbide & Carbon Co., Cleveland, will receive the Thomas W. Pangborn Gold Medal of AFS "for outstanding contributions to the Society and to the Ferrous Castings Industry, especially in the field of Gray Iron Metallurgy."

Howard J. Rowe, Chief Metallurgist, Castings Div., Aluminum Co. of America, Pittsburgh, will receive the William H. McFadden Gold Medal of AFS "for outstanding contributions to the Society and to the Light Metals branch of the Castings Industry."

William W. Maloney, General Manager & Secretary-Treasurer, American Foundrymen's Society, Des Plaines, Ill., the Joseph S. Seaman Gold Medal of AFS "for enthusiastic leadership and completely unselfish devotion to the Society as its Secretary and General Manager."

The accomplishments of six additional leaders in the metal castings field were recognized universally by AFS through Awards of Scientific Merit:

Mervin H. Horton, Materials Engineering Div., Deere & Co., Moline Ill., "for technological contributions over many years to the Gray Iron and Sand Divisions of the Society."

Kenneth H. Priestley, President, Vassar Electroloy Products, Inc., Vassar, Mich., "for long and conscientious effort in the development of Gray Iron Shop Course programs at the AFS Annual Castings Congress."

Franklin B. Rote, Technical Director, Albion Malleable Iron Co., Albion, Mich., for "noteworthy contributions to the AFS Malleable Division in furthering the technical prestige of the Society."

Frank S. Brewster, Director of Research and Development, Brumley-Donaldson Co., Huntington Park, Calif., for "valuable service to the Society and the Castings Industry in the development and dissemination of basic Sand Technology."

Ernest T. Kindt, President, Kindt-Collins Co., Cleveland, for "faithful and continuous service to the Society and the Patternmaking branch of the Castings Industry."

Fred G. Sefing, Metallurgist, Development & Research Div., International Nickel Co., New York, for "long and conscientious service to AFS and the Castings Industry in fostering Foundry Educational Programs at all levels."

Presentation of the awards will be made in Cleveland at the Annual Business Meeting of the Society, during the 1958 AFS Foundry Show and Castings Congress May 19–23.

SUMMER SESSION SCHOLARSHIPS FOR GRAPHIC ARTS TEACHERS

Graphic arts teachers throughout the nation will have an opportunity to compete for eight special summer school scholarships at Stout State College, Menomonie, Wis., this summer, as announced by the Education Council of the Graphic Arts Industry, Inc.

Made possible by a $2,500 personal contribution of Elmer G. Voigt, chairman of the board of Western Printing and Lithographing Company, Racine, Wis., the educational awards will finance the attendance of eight printing teachers at Stout from June 23 to August 1 for a course entitled "Technical Problems in Graphic Arts." The aim of the special course, which may be taken for undergraduate or graduate college credit, is to help improve graphic arts educational offerings in America's schools.

Eligible to compete for the scholarships will be teachers of printing with at least one year of teaching experience and no more than five.

Application forms for the "Elmer G. Voigt-National Scholarship Trust Fund Summer School Scholarship at Stout State College" are now available from the *National Scholarship Trust Fund of the Education Council of the Graphic Arts Industry in Washington, D. C.* Each scholarship is valued at $312.50.

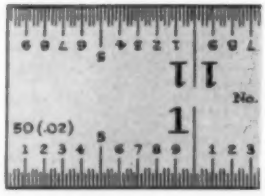
Want a nut to stay tight on a bolt? Dip the threaded end of the bolt into thinned, fresh shellac and screw on the nut. When dry, the shellac will prevent loosening yet the nut can be easily removed with a wrench. — *Shellac Information Bureau.*

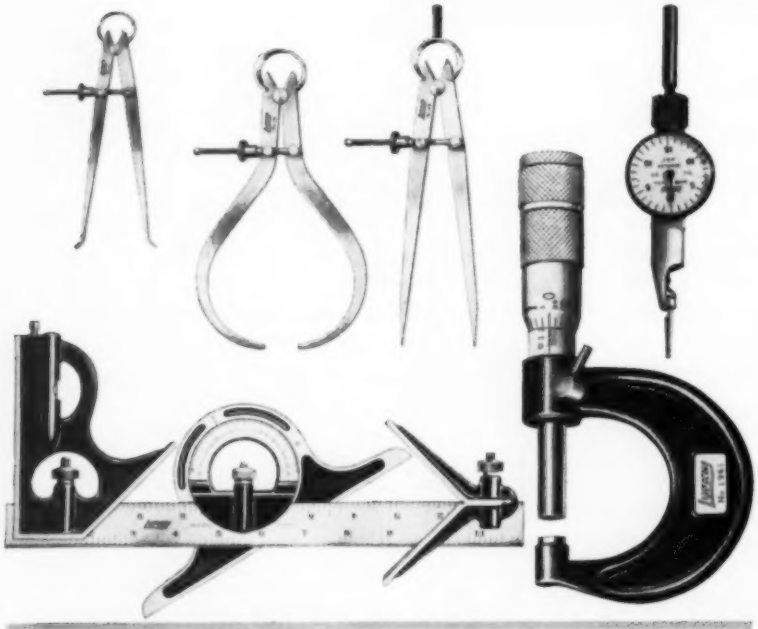
Automobiles alone account for nearly 74 per cent of all highway gasoline consumption. — *Petroleum Newsnotes.*

LUFKIN precision tools stand up under rugged student use

Lufkin precision tools have built-in durability . . . help cut your costs. Yet provide utmost accuracy and convenience to help students do faster, better work.

Specify Lufkin precision tools for your school shop. Write today for your complete Lufkin catalog. The Lufkin Rule Co., Saginaw, Mich.





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McKNIGHT Practical Shop Books!
...written for teachers by teachers

...Filled with useful ***TELL HOW TO*** *and* ***SHOW HOW*** *information*

#1 General Shop
BENCH WOODWORKING

(Revised in 1955)

By Fryklund and LaBerge

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- Covers fundamentals of hand woodworking
- Provides instruction on basic hand-tool operations
- 387 "show-how" drawings and pictures illustrate information topics, give details of techniques
- Valuable technical and related information
- All about tools and how to use them, types of occupations, sources of wood, processing.

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CLOTH BOUND, $3.00 PAPER BOUND, $1.50

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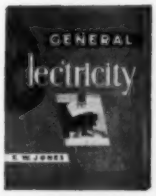

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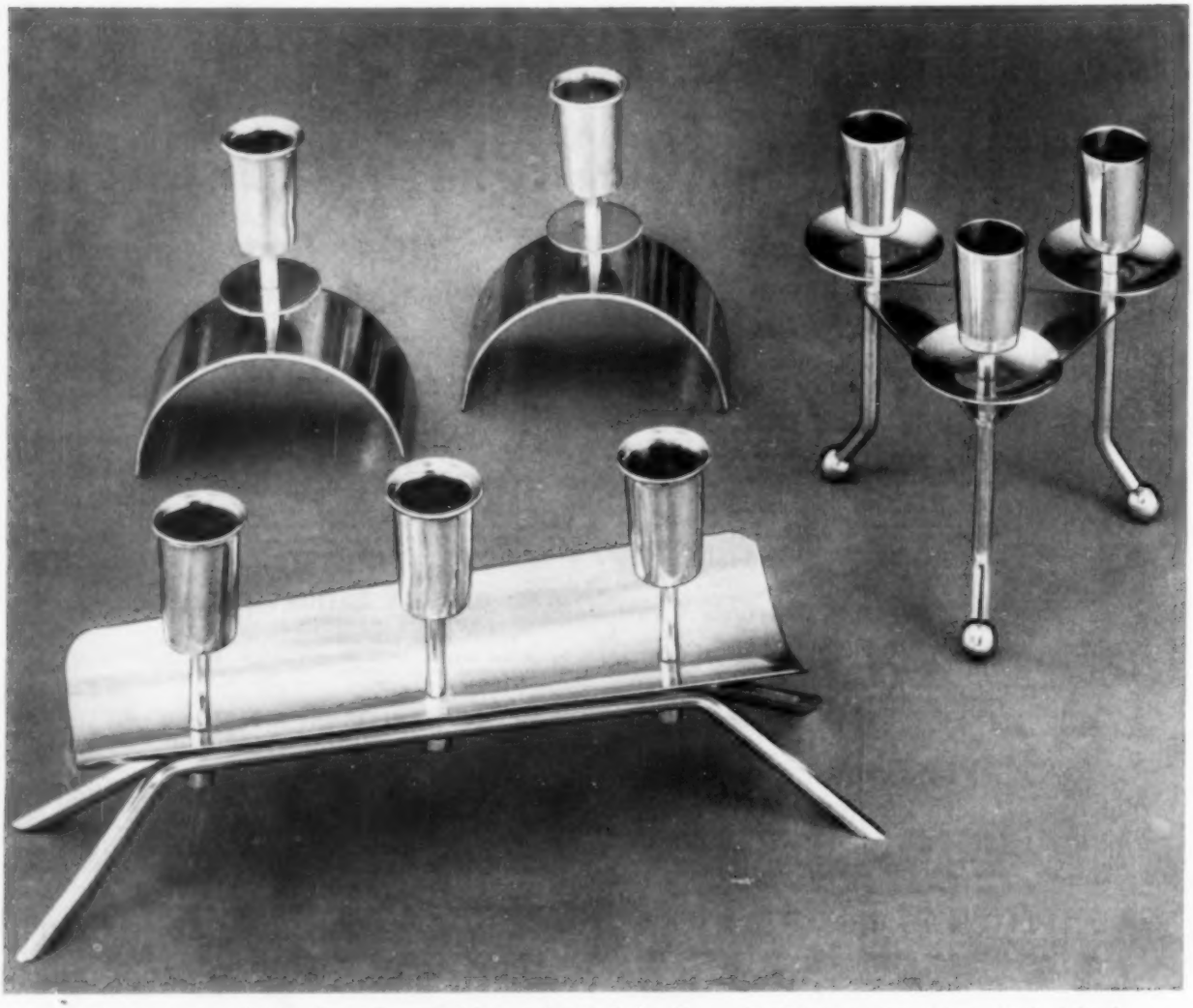

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AN INTERNATIONAL TRIUMPH FOR INDUSTRIAL ARTS EDUCATION

JOHN M. FONTANA
A. S. Somers Junior High School
Brooklyn, N. Y.

The Brooklyn Guild of Teachers of Industrial Arts, famed for its unusual type of professional meetings that draw a large attendance each month, recently used the theme of "Industrial Arts Marches On." The slogan was by no means a boast but a statement of fact. Evidence of the progress being made by industrial arts in general education is quite apparent by its accomplishments. In small towns and large cities the pulse of the average school is measured by the performance of its industrial arts department. No other area is as creative or as functional as exemplified by the things it accomplishes in finished projects. No other program in the school is as well-rounded or does a public relations job as thorough as industrial arts. The Ford IAA through its masterfully engineered program is considered the finest contest of its kind in the world. The privilege of entering these contests and the incentive to create something of real interest is an example of the hold industrial arts has on the community, the administrators and the boys and girls in school.

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(Continued on page 32A)

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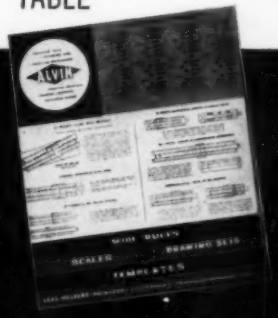

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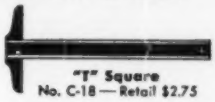

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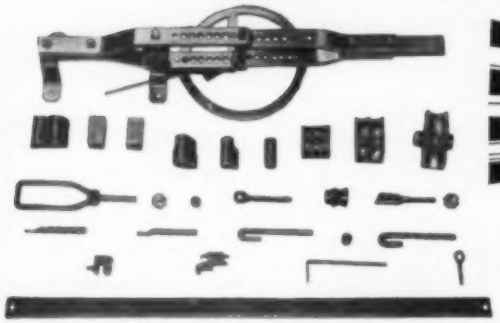

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INTERNATIONAL TRIUMPH

(Continued from page 30A)

stages of laying out and designing the format, it was decided to make it a real project in the form of a hard covered book. The dummy pages were drawn, the type size and line width was established, so — the boys began to work. Each student set a portion of copy. After two pages were set, spaced and proofread they were locked up and printed on a 10 by 15 platen press. This was the pattern we followed; two finished pages of type were distributed, followed by the setting up of two more pages while a two-page form was being printed. This was the method used by Gutenberg in the early fifteenth century. Within four months all the pages were completely produced. The energies expended by the students represented two-thirds extracurricular time and one-third school time. Binding each book was a more leisurely operation than the typesetting, the proofreading, locking up, and presswork.

The finished project was an artistic limited edition of 200 numbered copies. Same number of copies as the first printed Bible. The book was printed in gold, black, red, and maroon colored inks. Illustrations include linoleum blocks, line cuts, and a half tone picture of a page from the 36-line Gutenberg Bible. Page size of finished book is 6 by 9 in. A specially designed book jacket covers the case-bound book.

Through correspondence with Dr. Aloys Ruppel, director of the historical Gutenberg Museum in Mainz, Germany, he became interested in our project and requested a copy for the museum. The number one copy of "Mankind's Greatest Invention" was personally presented by me to the museum on July 30 of last year. A letter from Dr. Ruppel followed in which he states in part:

The Gutenberg story "Mankind's Greatest Invention" was a great pleasure to me, and I kindly ask you to accept my thanks for this gift. I can imagine the zeal and hard endeavors the young printing students made to produce this book so well done with regard to hand setting, printing, and binding. Please remit to them my compliments. I will be pleased to join the number one of this edition to the collection of the Gutenberg Museum.

Copy number four was accepted by the North American College in Rome on August 14 to be presented personally to Pope Pius XII to be placed in the Vatican Library. Copy number seven is to be presented to the Library of Congress.

What a triumph for industrial-arts education in America to have three copies of a book describing a great inventor who printed the greatest Book of all time, rest in three of the most

famous literary centers of the world. What a thrill and an achievement for the youngsters who produced the project. The prestige and good will we attain from our friends across the seas through the presentation will be enhanced by the thought that education does not come only from the classroom but from the shop laboratory as well. This is the area where instruction crystalizes in a most tangible form.

It is fitting to mention that the finished book has been judged by prominent men in industry as an outstanding specimen of the graphic art.

CONTENT AND SCOPE OF INDUSTRIAL ARTS IN INDEPENDENT SCHOOLS

SAMUEL C. BEELER
Director of Mechanical Arts
Grosse Pointe University School
Grosse Pointe, Mich.

The primary purpose of some five hundred independent schools in the United States is to prepare their students for college; it is also their objective to give as general an education as possible.

A part of this general education is industrial arts; to expose a student to only the academic side of the school curriculum is to cheat him of that well-balanced program that is so important for life today. The contention that extra-curricular activities, those other than purely academic, are a distraction from the purposes of education, rather than a means of realizing them, is a delusion. Many teachers believe that students whose academic preformance is unsatisfactory should be barred from participation in other activities. Generally speaking, however, the prohibitory errs in two respects. First, as it has been said, it implicitly denies that nonacademic activities contain educational values, labeling them divisionary. Second, it embraces the notion that, if a student is forbidden to participate in projects which he evidently enjoys and from which he is apparently deriving, in marked degree, the satisfaction of successful accomplishment, he will turn to his studies with new heart and energy. It seems probable that agreeable achievement in a naturally attractive field will put a student, if he is wisely admonished, in a better mind to attack the duties of the classroom.

With colleges and universities believing that industrial arts is a necessary phase in the development of young people, and with headmasters of many

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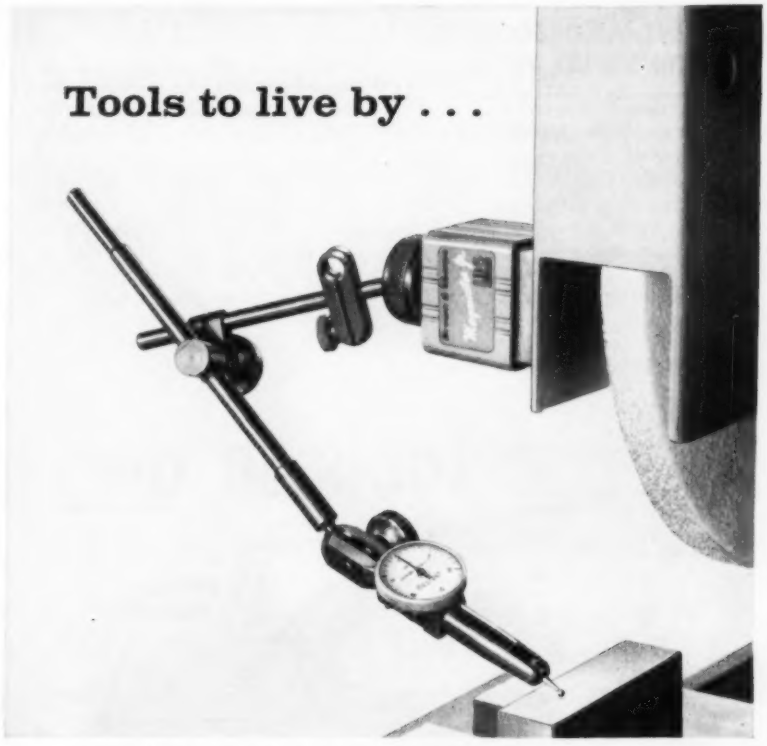

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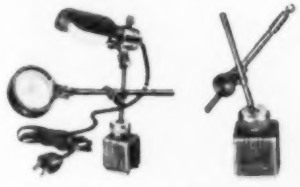

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CONTENT AND SCOPE OF INDUSTRIAL ARTS

(Continued from previous page)

of our largest and oldest independent schools agreeing, some questions should be asked of the independent schools to see how they as a group are accepting this challenge and revising their curricula to meet this concept of general education.

Many of these schools, according to the statements in their catalogues, mention industrial-arts subjects as a part of the school curriculum, either as handicrafts, shop, manual training, industrial arts, or mechanical arts. After considerable research into the field of industrial arts as it applies to the independent schools, one finds that there are about as many different concepts relative to this subject as there are schools. That there is no common understanding regarding the subject, its objectives, content or scope, is to put it mildly.

Naturally, it was impossible to survey all of the independent schools in the country, so this particular survey is limited to the member schools of the Private School Association of the Central States. This association includes military, boarding, and country day schools with large and small enrollments, some exceeding six hundred pupils. The Private School Association of the Central States, of which there are some sixty members, represents a very definite cross section of the independent schools the nation over.

For the purpose of the survey a questionnaire was prepared consisting of two parts: one part addressed to the administrative head of the school, the other addressed to the faculty member in charge of any activity closely resembling and qualifying as an industrial-arts subject.

Sixty questionnaires were sent out to member schools of the Private School Association of the Central States and 58 replies were received. This response in itself is very significant, inasmuch as it represents a very definite interest on the part of the independent schools in this subject of industrial-arts activities.

For convenience the schools surveyed are classified as military, boarding (other than military), or country day schools. There were 17 military schools, 11 boarding schools, and 30 country day schools studied.

In the industrial-arts field it was found that there was a marked variance in the offerings of industrial-arts subjects, and the following table shows the general tendencies.

	Number of Schools Offering Subject	*Total Number of Schools*
Military schools		17
No industrial arts offerings	9	
Industrial arts as hobbies	2	
Industrial arts as extra-curricular	2	
Industrial arts as credit subject	4	
Boarding schools (other than military)		11
No industrial arts offerings	3	
Industrial arts as hobbies	1	
Industrial arts as extra-curricular	2	
Industrial arts as credit subject	5	
Country day schools		30
No industrial arts offerings	8	
Industrial arts as hobbies	0	
Industrial arts as extra-curricular	9	
Industrial arts as credit subject	13	
Total		58

Of the 58 schools surveyed the offerings of the industrial-arts subjects present a most interesting picture, in that 20 schools offered no industrial-arts subjects, 4 offered one industrial-arts subject, 1 offered two subjects, 5 offered three subjects, and 28 offered four or more industrial-arts subjects. One may conclude from this that those schools offering industrial arts are trying to

(Continued on page 36A)

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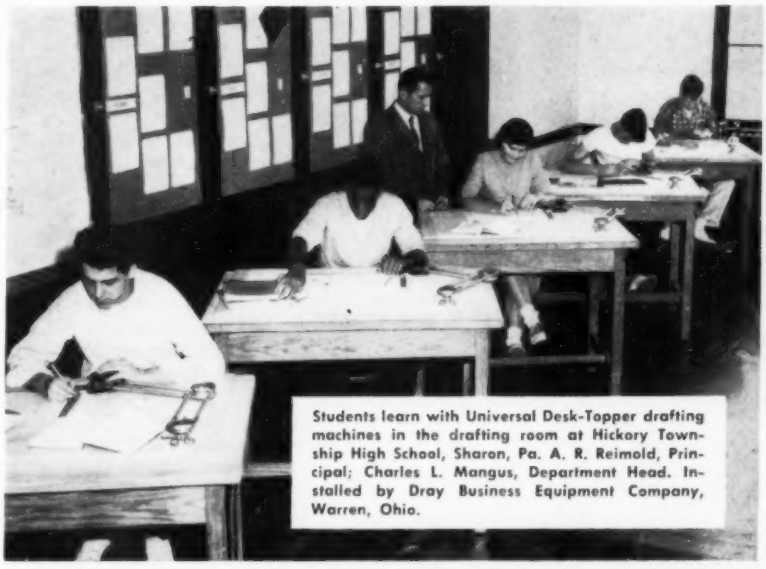

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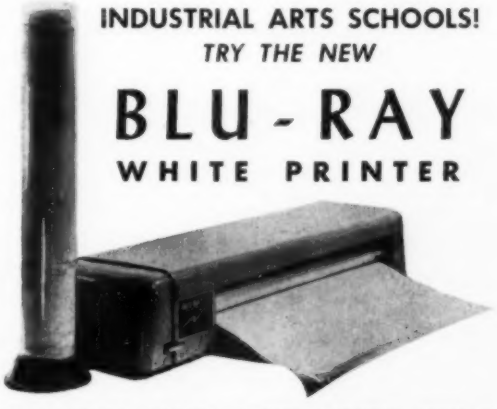

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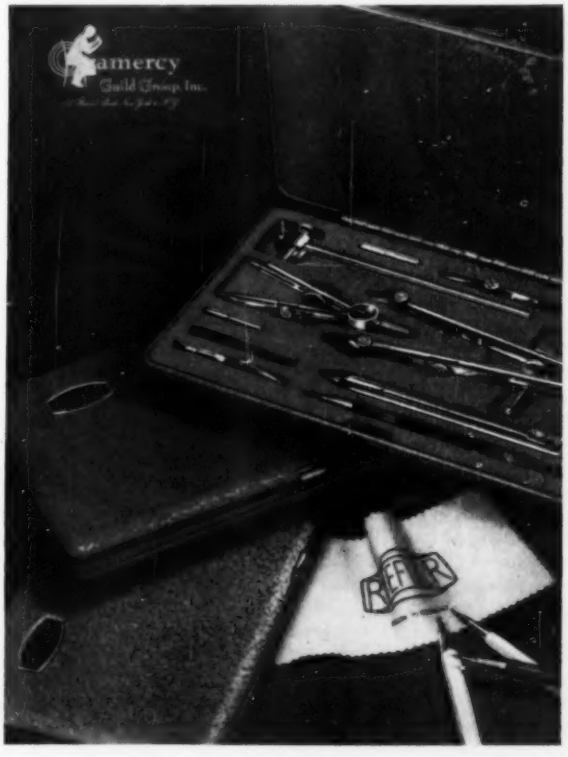

CONTENT AND SCOPE OF INDUSTRIAL ARTS

(Continued from page 34A)

give their students as broad a field from which to choose as possible. Of the 38 schools offering shop subjects 73 per cent are including four or more subjects in the curriculum.

Thirty-eight independent schools in the Central States area are offering industrial-arts subjects to their students in some form and the popularity of the courses offered is indicated in the Subject Frequency List.

SUBJECT FREQUENCY LIST

Subject	*Number of Schools*
Woodworking	21
Mechanical drawing	17
Plastics	12
Metalwork (art metal and wrought iron)	11
Auto mechanics	8
Architectural drawing	7
Machine shop	6
Leatherwork	6
Printing	6
Electricity	5
Other (puppets, stagecraft, etc.)	3

It will be noted that the subject appearing most frequently is drawing, appearing 17 times as mechanical drawing and as architectural drawing in seven of the schools for a total of 24 schools offering some type of drawing as an industrial-arts subject. The statements received from the schools offering this subject revealed that it was the least costly of all subjects and required the least room. Costly equipment was unnecessary and the work could be done in almost any regular classroom.

The second most frequently offered subject, as is proved by the Subject Frequency List is woodworking. Statements justifying its place in the list are that it is the medium with which we have worked the longest. Woodwork had its beginning as far back as 1868 when the influences of Germany, Russia, and Sweden were being felt in the United States and affecting the teaching of what was to become industrial arts. The method which seemed to have the most influence was that of Sweden, known as Swedish Sloyd and later to be known in the United States as manual training, the forerunner to the present industrial arts.

It must be noted that the third most popular subject, unlike the woodworking, is one concerned with a most recent industrial field, that of plastics. Again it proved that it was a rather easy subject to introduce because of the kind of equipment and the type of shop necessary to carry out the activity. It is a medium which adapts itself well to the woodworking shop. All of the equipment and tools which one uses in woodworking can be used in the teaching of plastics.

The author finds that it is of special significance that auto mechanics should appear as a subject being offered in 8 of the 38 schools offering industrial-arts subjects. This is a very technical subject and requires special tools, equipment, facilities, and instruction. Yet, it will be noted that about 24 per cent of the schools offer it as a regular school subject.

Printing is present in 6 of the 38 schools. This subject very definitely requires special equipment and instruction. The schools reporting it as a school subject state that many school jobs were done in the shop of this activity, such as athletic programs, banquet menus, school-dance programs; besides projects of a personal nature, as stationery heads, calling cards, Christmas cards, and the like.

Machine shop, leatherwork, and electricity appear in the Subject Frequency List six times each. The first, machine shop, is a subject that was offered in the schools reporting that four or more industrial-arts subjects appear in the curriculum. It is a highly technical subject and requires very special equipment and instruction. Leatherworking, one of the lighter craft-type activities, was a subject offered in those schools where industrial-arts subjects were considered as hobbies. Very little more than hand tools are required to carry on this activity. Electricity, on the other hand, a very technical subject, also appears six times and it is rather interesting that it is being offered in one school as a very complete electronics course dealing with electronics in all forms, even to the inclusion of radar. While in another school it is a seventh-grade subject, correlated closely with general science and only the basic fundamentals of electricity are introduced through the constructing of small electromagnets, motors, telegraphs, and crystal radios.

Other than leatherworking, the subjects usually classed as crafts are lacking from the list of subject offerings. This appears to prove that those schools offering shop subjects are trying to get away from the types of activities which may be classed as crafts or hobbies.

The types of shops within which the industrial-arts activities are carried range from highly specialized unit shops to the comprehensive general shop. Thirteen schools carry on their activities in the comprehensive general shop, six in general unit shops, three in unit shops, and one in a regular classroom.

From the survey it appears that many schools are not taking the industrial-arts subject area as lightly or as casually as they might lead some to think. For here again the 38 schools reporting show something very interesting concerning the space provided for industrial-arts subjects. Seventeen schools have one shop or room so equipped for industrial-arts activities, eight have two shops, six have three shops, two have four or more shops, and five report activities carried out in rooms other than specially equipped shops.

The survey has brought to light variances in the amount of time allotted to the industrial-arts activities, and the size of the classes participating in the program. Of the 38 schools offering industrial-arts subjects only twelve of them had each class meet five times a week; five others had the classes meeting four periods per week; eight, three periods a week; ten, two periods a week; and three schools had industrial-arts classes meeting only one each week.

Those classes which were meeting five times each week were classified as full-unit courses and students received a full unit of credit for successfully completing such a course, while the classes meeting two days a week were half-unit courses and participants received only a half unit of credit. The latter allows a more varied program of industrial-arts experience, for a student has the opportunity to explore into many more areas, even if the exploration is not as thorough. Those meeting less than two periods per week offered no credit.

The length of the class periods varied as much as the number of times each class would meet. The majority of schools — 18 — preferred the 40-minute periods, and two of the schools had their classes meeting for 60-minute periods.

The time spent in industrial-arts classes, though it may be judged skimpy, is aided somewhat by the fact that the independent school limits the number of pupils in a class. The most outstanding advantage of the private school is the low pupil-teacher ratio. In the industrial-arts classes the average seems to be, as indicated in the survey, eight students to each instructor. This compares favorably with the ratio found in the academic classes. The survey disclosed that 2 schools had a ratio of 1:1 to 5:1; 18 schools reported the ratio of 6:1 to 10:1; 10 schools the ratio of 11:1 to 15:1; and only 8 schools reported a ratio above that of 15:1.

With classes the size mentioned above the instructor has a greater opportunity to devote much more time to each individual and thereby compensate for the shorter periods.

Another fact that presented itself as the survey was carried on was that the independent schools are offering industrial-arts subjects to more of their pupils than many other educational institutions. Of the 38 schools reporting

(Continued on page 38A)

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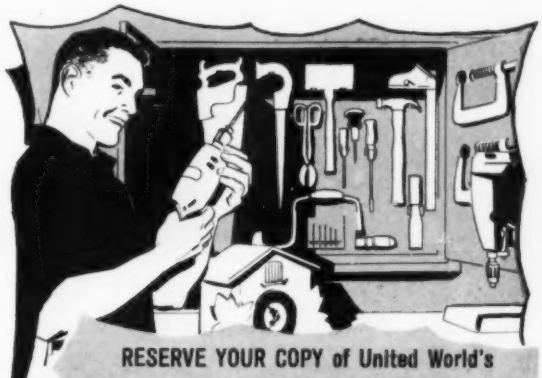

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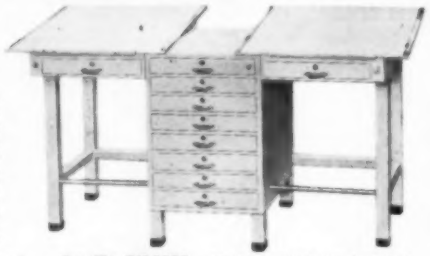

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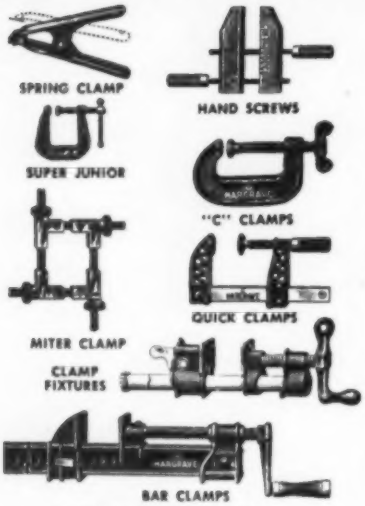

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CONTENT AND SCOPE OF INDUSTRIAL ARTS

(Continued from page 36A)

industrial-arts subjects in their curricula, 14 were beginning the subject in the lower elementary grades and several started the activity in the kindergarten. Twenty schools reported offerings in grades four through six, while all 38 were offering industrial-arts activities to students on the junior and senior high school level. The significant fact is that more than 35 per cent are allowing students to participate in industrial-arts activities during their entire school life before college, and that over 50 per cent of the schools start their programs in the fourth grade, with 100 per cent starting the activity in the seventh grade. Certainly no one factor can prove so conclusively that the industrial-arts program is considered by the majority of the schools as a very necessary part of the school curriculum and a vital factor in the growth of young people.

The part of the questionnaire addressed to the administrative head concerned itself with the preparation and experience of the teacher responsible for the instruction given in the industrial-arts classes.

Again, being concerned with the 38 schools offering industrial-arts subjects, the study shows 5 teachers with no formal teacher training whatsoever; 13 with bachelor of science degrees; 7 with bachelor of arts degrees; 7 with the master degree; and 6 with some training other than those previously mentioned.

The same teachers were rated as follows concerning their training in the industrial-arts field: 18 had no formal industrial-arts education training; 10 of them had a minor in industrial arts; and 11 of them reported a major in industrial-arts education.

In almost 50 per cent of the independent schools covered by the survey, the regular academic teacher is assigned to handle such shopwork as the school might offer; the other 50 per cent are attempting to obtain qualified teachers in the field of industrial-arts education. The customary practice seems to use the mathematics teacher or the science teacher. In general, this probably secures as fine a result as might be obtained under such a method, but it is evident that unless a teacher has a specific training to handle industrial-arts work, he fails to appreciate some of the finer points and is not capable of giving to the pupils the greatest training and co-ordination with their other subjects.

The shop teacher is more than merely a disciplinarian. In fact, the shop teacher, to be really effective, must

understand the academic work in order that he may be able to encourage and direct the pupils along the proper channels in their hobbies and exploratory work. A good teacher must know his subject material thoroughly, and all information related to it, regardless of how remote it may seem. Each project that may be developed has its own peculiar details which demands personal experience and analysis before presenting it to the pupils, and the teacher should be prepared to step in at any moment and correct the work of the pupil.

Many of the teachers of the industrial-arts subjects who were lacking in training were reported to have had certain experiences that would be helpful with their attempts to teach a subject for which they had not definitely been trained. Twelve teachers were said to have had experiences in industry, while thirteen stated that they had had several summers of camping experience in the craft programs of private boys' camps. Along with this was reported the amount of teaching experience of the teachers responsible for the shop courses.

Five schools reported that their shop teachers had from one to five years of teaching experience, 8 had from five to ten years' experience, 13 had eleven years or over of teaching experience, and 10 schools reported that their teachers had no previous teaching experience.

The response to the questionnaire showed that the majority of independent schools were enthusiastic supporters of industrial-arts programs, but the following statements show why the programs are not accepted unanimously.

"No facilities. Time element in military school."

"Located in Chicago Loop area; space not available."

"We believe in no industrial-arts program, except as a hobby activity."

"Primarily a college preparatory school. Time is taken with English, math, science, history, and the languages."

"We are an elementary school and do offer very little art work."

"—— is a military and naval college preparatory school, and no industrial work is included in our curriculum as our every effort is directed toward successful college entrance."

"Our aims and objectives have not been of the kind that require a course in industrial arts. Moreover, we do not feel we could compete with the tax-supported institutions in the kind of equipment that would be required."

"We recognize the desirability of such work but do not see how we can fit it into our present program."

(Continued on next page)

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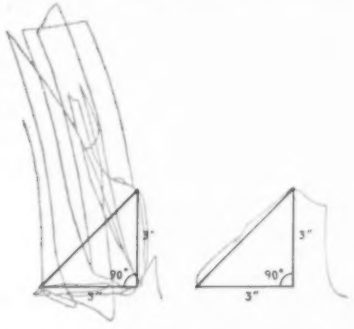

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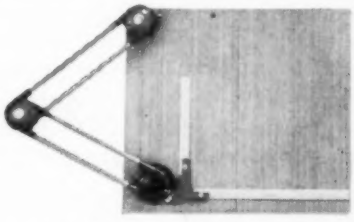

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CONTENT AND SCOPE OF INDUSTRIAL ARTS

(Continued from previous page)

"Lack of time and facilities. A small college preparatory school cannot do everything, if it expects to do well its primary job."

"Since our school is strictly college prep, we offer only straight academic subjects. Because of a crowded study schedule, requiring six hours of homework, no time is available for industrial-arts courses."

"We have no industrial arts program for two reasons: (1) we have had no perceptible demand, and (2) when we add to a strong academic program such activities as athletics, art, and music there is no time left for the industrial arts, as worth-while as they may be. Another factor is the matter of room and equipment, both of which we are short on."

"This is entirely a college preparatory school and we do not have any industrial arts whatsoever in our curriculum."

"We do not have industrial arts at —— for the following reasons: (1) Most of our pupils wish strong college preparatory courses. No time or place is left in the curriculum for industrial arts. (2) Parents and pupils know in advance the function of the school and make no demand for industrial arts. (3) With required military and required athletics there is little time in the daily program for noncredit courses. (4) We do not have the facilities for offering industrial arts and would not install them unless we felt we would have a steady and strong demand."

In light of the above statements it can readily be seen that many administrators are not in favor of expanding the curriculum to include subjects of a general education nature in fear of infringing upon the academic subjects' time. Yet, in the schools where subjects such as industrial arts are a part of the school's curriculum the students are entering colleges as they did before and remaining in college for the time required to earn a degree.

From the evidence presented, the study brought out the fact that the country day schools were making and will presumably continue to make the greatest strides forward.

This, in the main, may be reconciled to the fact that where there is a more complete expression of the normal home life, there is found a more normal healthy unfoldment of ideas. In each of the cases studied for this type of institution, it is shown that the industrial-arts program was fairly well developed, being deterred only by the financial ability of the school to meet the demands of the training.

The conclusion is, from the survey, that the other types of independent schools, on the whole, are leaning toward the side of pure academics; whereas the modern trend in the affairs of the world show a need for a more universal experience in school.

The primary purpose of this study is to present the condition of the industrial-arts field of education as it pertains to the independent school, and to throw some light on the need for broadening the school program to meet the challenge of providing the young people with as general an education as time and facilities will allow.

The following recommendations, as a result of this study, seem to be in order:

1. That the independent schools review their curricula in light of the offerings now available to their students.
2. That a more serious attitude be taken relative to those subjects not classified as purely academic.
3. That the schools planning to enrich their curricula with industrial-arts subjects seriously consider the professionally trained industrial-arts teacher as the best qualified person to carry out a successful program.

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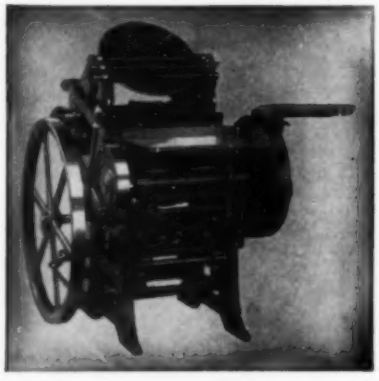

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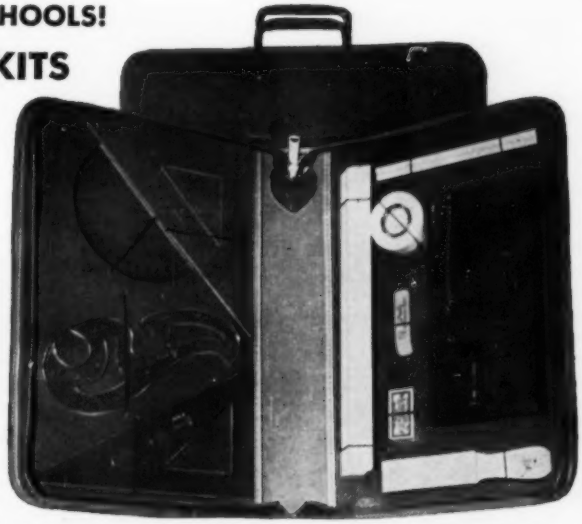

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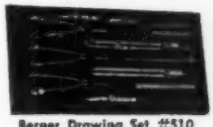

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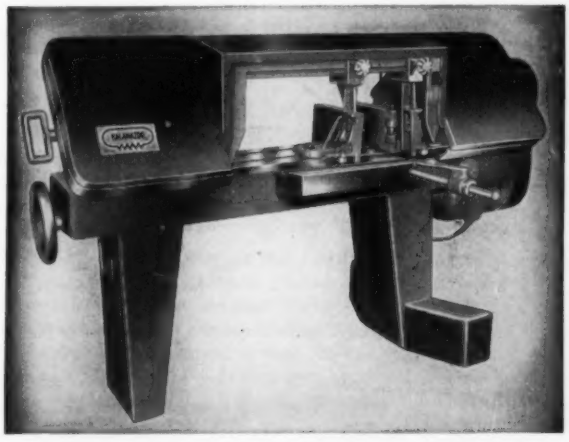

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New Publications

Problems in Teaching Industrial Arts and Vocational Education

By Walter B. Jones. Cloth, 213 pp., 6 by 9 in., $2.50. The Bruce Publishing Company, 400 North Broadway, Milwaukee 1, Wis.

The author of this book is an outstanding Pennsylvania educator. He is a professor of Education and director of Vocational Teacher Education at the University of Pennsylvania.

The book presents a collection of problems and solutions which are common to the teacher and supervisor in industrial education, and the solutions that have been found helpful by hundreds of experienced, outstanding industrial teachers. It is intended for the supervisor, the in-training teacher, and those already in service to help him do a more effective job of preparing young men for skilled jobs in industry.

Fun With Metalwork

By J. W. Bollinger. Cloth, 184 pp., 6⅛ by 9¼ in., illus., $4.75. The Bruce Publishing Co., 400 N. Broadway, Milwaukee 1, Wis.

This book offers numerous directions on how to work with metal; cutting it to shape; kinds of metals to use for silhouettes; how to solder, braze, and weld; how to make bends and shape scrolls; and how to decorate metal with paints, enamels, lacquers, and bronzing powder.

The homecrafter, the student of metalwork, and the man who likes silhouettes will be highly pleased with this book.

New Key to Weaving

By Mary E. Black. Cloth, 571 pp., 6¾ by 9¾ in., illus., $12. The Bruce Publishing Co., 400 N. Broadway, Milwaukee 1, Wis.

This text is a complete revision of an earlier book by this same author who knows weaving from beginning to the end.

She started as an amateur, taught it in her classes of occupational therapy, and then took an extensive course in Sweden.

It is a book for the beginner, the teacher, the hobbyist, and the interested practical weaver.

There are 17 chapters which inform the reader all about the loom, how to dress the loom, loom controlled and finger manipulated plain weaves, twills, miscellaneous weaves on twill treading, overshot, crackle weave, summer and winter weaves, Bronson, one-shuttle weaves, combination weaves, miscellaneous weaves, tartan weaves, tapestry weaves, theory of weaving, and general information.

A glossary, a list of weaving terms used in foreign countries, and a comprehensive bibliography listing books and periodicals, are part of the book.

The Complete Outboard Boating Manual

By Ernest Venk. Cloth, 281 pp., 5⅝ by 8½ in., illus., $4.95. American Technical Society, Chicago, Ill.

This is an exceptionally fine book for the outboard boating enthusiast. It gives him the things he wants to know when he is selecting a new boat, when he wants to know how to operate an outboard motorboat, or when he has to make repairs on his boat's engine.

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Like recipes in a cook-book, schedules for finishing and painting are simple, easy to follow. Each complete by itself. Here are 549 up-to-date schedules prepared, tested & proved by paint chemists, professional finishers. Not a book of formulas. These schedules utilize standard materials available everywhere. 100s of new, better finishes never before in any finishing book. **$3.95**

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Detailed plans for building 27 varieties of cabinets, 19 styles of bookcases, 31 decorative wall shelves. **$3.95**

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Every kind of table you need. Selected professional designs. 35 styles to choose from. Plus 10 chairs, plain and upholstered types. 8 home desks including student, antique and modern. 4 settees, settles and seats. Over 300 detailed drawings. Clear instructions for making every piece. 325 specially-made photos guide you from start to finish. **$3.95**

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How to make 171 practical, little-known bench aids, clamping devices, storage racks, shop equipment. **$3.95**

SELECTED WOOD TURNING PROJECTS
Over 70 useful, decorative trays, bowls, tables, lamps, inlaid turnings. Also 30 best period turning profiles. **$3.95**

BUILT-IN CABINETS and STORAGE WALLS
Practical, professional designs, details for built-ins, room dividers, closets, chests, wardrobes, music centers, bathroom counters, cabinets, new eye-level ovens. Also a complete chart of size standards of household items — the help you need to teach or build practical built-ins. **$3.95**

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Publishers of Home Craftsman Magazine

guard regulations, state regulations, American Power Boat Association rules, and equipment dealers list.

Basic Television (5 Volumes)

By A. Schure. Paper covers, 688 pp., 6 by 9 in., illus., Individual Volumes $2.25 each — per set $10. Also available: 5 volumes in single cloth binding $11.50. John F. Rider Publisher, Inc., New York, N. Y.

This is an understandable presentation of the basic theory, operation, and circuitry of black and white television. Everything from the transmitter to the picture on the screen is explained with great clarity in words as well as illustrations that "visualize" each concept discussed. Complete in themselves, each volume treats separate stages of the receiver combining to form a thorough and accurate course. Closed circuit television is also covered.

The five volumes contain over 700 illustrations.

Choosing a Career in America's Hotels

Paper, 22 pp., 6 by 9 in., illus. Released by the American Hotel Association, 221 West 57th St., New York City.

This is a new illustrated booklet which sets forth the job opportunities and advantages to be found in the hotel business. It is available for distribution to schools, vocational advisers, and public libraries.

The booklet describes the manifold activities involved in hotel operation and the variety of positions available for the career-minded person.

Illustrated with charts and photographs, it explains in detail the departmental organization of an average-size hotel, its staffing, and duties of the personnel.

Ranked fourth among American service industries, the nation's 15,327 hotels do an annual gross business of $2,150,360,000. The total value of all hotels, in terms of land, buildings, furnishings, and fixtures is in excess of $6 billion.

Practical Astronomy

By W. Schroeder. Cloth, 206 pp., 6½ by 8⅞ in., illus., $6. Philosophical Library, Inc., New York, N. Y.

Readers who are interested in astronomy will be delighted with this book. The descriptive material is simply expressed and the illustrations are well drawn.

Such chapters, as No. 3 on stars that are visible throughout the year, and No. 9 on solving problems, will prompt the interested more than other books on the subject to go on and try to understand what the author is explaining.

Chapter 14 on the telescope, gives simple directions how binoculars can be mounted and used for making simple observations. Directions are also given for making a telescope for making real astronomical observations that are more satisfying.

There also is a chapter listing 140 interesting objects in the sky.

A Status Report on Research in Circular Sawing of Wood — Vol. I

By Dr. James L. Lubkin. Paper, loose-leaf, 193 pp., 8½ by 11 in. DeWalt, Inc., Lancaster, Pa.

A theoretical discussion of the results of studies made in the past 20 or 30 years to improve the efficiency of the circular saw.

Many interesting discoveries were made. Just to mention one of them, it was found that a thin vibrating saw would require more power and removed up to 20 per cent sawdust than the heavier but more stable blade.

(Continued on next page)

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NEW PUBLICATIONS

(Continued from previous page)

The Rocket

By Air Chief Marshal Sir Philip Joubert De La Ferte. Cloth, 190 pp., 5¾ by 8½ in., illus., $6. Philosophical Library, Inc., New York, N. Y.

This book contains a short historical account of the evolution of rockets as weapons of war. It reads like an exciting story and gives a clear picture of what conditions were in Europe during part of World War II. The story shows clearly in parts that the author did not see eye to eye with what the United States was and is doing.

The book presents the story of rockets and rocket warfare under the following headings: Peenemunde, photographic reconnaissance, Hitler and the revenge weapons, the Sandys investigation, the attack on Peenemunde, the story of VI, the battle of the sites, home defense, the shape of things, N.A.T.O. strategy, the new look, the march of communism, envoi, and appendix I and II.

Aircraft Annual 1958

By John W. R. Taylor. Cloth, 96 pp., 7¼ by 9¾ in., illus., $6. Philosophical Library, Inc., New York, N. Y.

An interesting book full of such information as Capt. J. W. Kittinger's U. S. A. F. flight in a research balloon making an ascent of 96,000 ft.; or a nonstop round-the-world flight of 24,325 miles in 45 hours and 19 minutes; also a description of Britain's most popular sport — gliding.

The 20 articles in this book describe: "One Year's Progress," "Hay Drop on the Gila," "Flying Without a Motor," "The Future of Air Power," "What's New on the Airways?" "Test Flights in Miniature," "What's New in Military Planes," "Air Age Meets Ice Age," "Eyes Get Sea Legs," "Atlas and Titan," "Flying Cowboys," "Coffee Patrol," "Brightening the Bombers," "Flight Through History," "Russia's Fighting Aircraft 'Apex,'" "Jumping for Joy," and "Thoughts on the Technical Scene."

Rider's Basic Science Series

John F. Rider Publisher, Inc. announces the publication of two more books in its new *Basic Science Series* entitled *Heat* and *Sound*. According to the publisher, the *Basic Science Series* is aimed to meet the needs of growing interest in scientific knowledge on the part of the public as well as industrial personnel desiring to improve job status and students who want a more concentrated and broader study of a particular phase.

The series was started some months ago with the publishing of a reprint of *Energy* by Sir Oliver Lodge. Lodge was one of the world's most famous scientists. His treatise on the subject still stands as an accurate, brilliantly written, and crystal-clear explanation of energy. This edition was modernized and illustrated.

The two new titles which forecast the step up in production of books in this series, *Heat* and *Sound*, live up to the aims of the series. Both are written by the eminent Dr. Alexander Efron, chairman of the Physics Department of the science-oriented Stuyvesant High School, in New York.

Heat, while it is a classical study of the subject, progresses to the modern concepts of basic thermodynamics and their applications to heat engines such as turboprops, ramjets, and rockets. *Sound* covers the physical nature of sound and the characteristics of hearing with all the ramifications of acoustics, musical instruments, and the human voice.

Current plans for more titles in the *Basic Science Series*, the publisher said, include books on mechanics, optics, fluids and gases, and nuclear energy.

TV Tube Location and Trouble Guide (RCA)

Paper, 56 pp., 5½ by 8½ in., illus., $1.25. John F. Rider Publisher, Inc., New York, N. Y.

This book shows the tube locations for all RCA, TV receivers produced between 1947 and 1956. It lists the tube complement, key voltages, and common troubles correlated with the tubes that may be responsible for them. Complete chassis and model index.

Modern School Shop Planning

Paper, spiral binding, 184 pp., 8½ by 11 in., illus., $3.85. Prakken Publications, Ann Arbor, Mich.

This is a revised edition containing plans and specifications of new shops gathered from various sources. It also presents chapters on storage facilities and equipment and material supplies.

Automotive Job Sheets

By Harold S. Bostwick and Randolph R. Barr. Chilton's Book Division, Philadelphia, Pa.

Volume I — The Engine with Supplement on the Fuel System. Paper, 130 pp., 7 by 10⅛ in., illus., $3.80.

Volume II — The Chassis. Paper, 74 pp., 7 by 10⅛ in., illus., $2.45.

Volume III — The Automotive Electrical

(Continued on page 46A)

4 new "package deals" on machinery for your shop!
Four new "package deals" of Di-Acro Precision Machines are now offered to school shops only at these low prices. Brake and Roller are Spartan models, designed especially for schools. Bender, Notcher and Shear are industry proven. Benches are heavy gauge steel.
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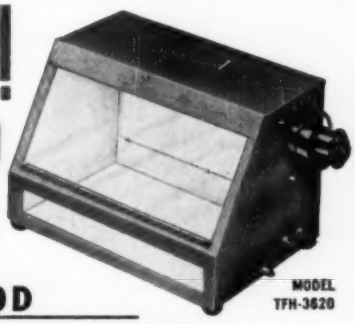

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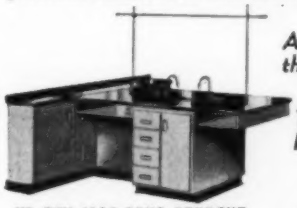

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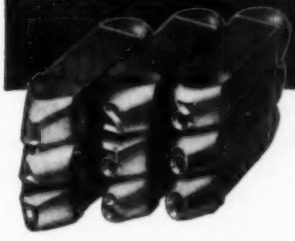

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Write for Bulletin LF-108 and for Special Literature on Marking — for use in Industrial Arts Instruction.

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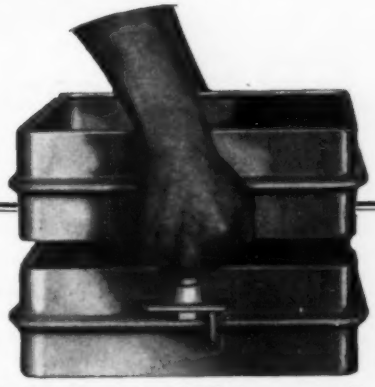

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You'll find Sterling Style "E" Flasks exceptionally easy to handle because pin lugs are combined with handles. In many foundries, these Style "E" Flasks have replaced snap flasks. They prevent runt outs . . . require less sand. Sterling Steel Flasks combine maximum strength with minimum weight. They retain their rigidity and accuracy, year-in, year-out. Write for Sterling Catalog.

STERLING WHEELBARROW CO. Milwaukee 14, Wis., U.S.A.

NEW PUBLICATIONS

(Continued from page 44A)

System. Paper, 72 pp., 7 by 10⅛ in., illus., $2.45.

Teachers Manual and Sourcebook.

These three volumes and the manual comprise a series of automotive job sheets which the student can follow at his own personal speed. The three volumes cover a full three-year's course.

Each unit presents a complete list of the required tools for the individual jobs, and describes clearly just what the student is to do.

The job sheets can also be rearranged to make a course that is as flexible as the teacher may desire.

Techniques of Magnetic Recording

By Joel Tall. Cloth, 472 pp., 5¾ by 8⅞₁₆ in., illus., $7.95. The Macmillan Co., New York, N. Y.

This useful book shows how the sounds of the present may be recorded for those who wish to reproduce them in the future.

The book presents the subject in nontechnical language and by practically excluding all mathematics.

The 20 chapters present the development of magnetic recording, simplified theory of magnetic recording, recording media and their manufacture, drive mechanism, erasing, fundamentals of magnetic sound recording, recording sound in nature, maintenance, spurious printing, editing, recording and copying techniques, radio broadcasting practice, motion-picture and television techniques, information recording, magnetic recording in the medical field, magnetic recording in education, home use and telephone recording, public entertainment, advertising, and warning methods, legal uses and their limitations, and some techniques in communication.

Sticks and Stones

By Lewis Mumford. Paper, 238 pp., 5⅜ by 8 in., illus., $1.60. Dover Publications, New York, N. Y.

This is the second revised edition of this book. In 1924 literary critics were already pointing out the existence of our rich literary past, but no comparable attempt had been made to do a similar service for American architecture.

When "Sticks and Stones" was published in 1924 by Lewis Mumford he found very little to guide him because the story of American architecture by 1860 was a pathless waste.

The present revision then is an attempt to give the reader of this edition a continuation of what architecture has accomplished from 1924 to 1954.

The eight chapters present the medieval tradition, the heritage of the renaissance, the classical myth, the diaspora of the pioneer, the defeat of romanticism, the imperial façade, the age of the machine, and architecture and civilization.

Major Activities in the Atomic Energy Programs, January–June, 1957

Paper, 257 pp., 5⅞ by 9⅛ in., 75 cents. Superintendent of Documents, Government Printing Office, Washington 25, D. C.

This U. S. Atomic Energy Commission report covers a résumé of the descriptions of power reactors and industrial developments, the international activities, the operations and major activities, and the fuel research and power reactors worked upon during the period covered by the report.

It also describes the raw nuclear materials and the production of special nuclear materials, the military and civilian application, reactor development, declassification and classification, general and technical information, and education and training.

FREE teaching aid

Helps students to learn the difference between minimum "Code" wiring and wiring that provides a home with full HOUSEPOWER. Simple, easy-to-understand; will encourage class discussion. The project has been specifically prepared by The National Adequate Wiring Bureau in response to requests by vocational teachers for material about adequate wiring.

ELECTRICAL PLANNING FOR TODAY'S HOMES is presented in the form of a series of true-false questions and answers. It interprets technical theory in terms of the householder's daily use of electricity, based on the standard contained in the Residential Wiring Handbook developed by the Industry Committee on Interior Wiring Design.

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Business and Personal News

R. E. BRACKETT RECEIVES APPOINTMENT

The L. S. Starrett Company, Athol, Mass., announces the appointment of Reginald E. Brackett as assistant sales manager.

Mr. Brackett has been associated with the company since 1930 in various phases of sales work. Along with his new duties, Mr. Brackett will continue in charge of the company's dial gauge division.

BLACK & DECKER OPENS IN NETHERLANDS

Formation of a new subsidiary company in Rotterdam was announced recently by Robert D. Black, president and chairman of The Black & Decker Manufacturing Company, Towson, Md.

The new company, Black & Decker (Nederland) N.V., located at 61a Vondelweg, Rotterdam, will service the electric tool company's products in the Netherlands.

Martin Van Tol, Black & Decker sales rep-

(Continued on page 48A)

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SMOOTHNESS	A+
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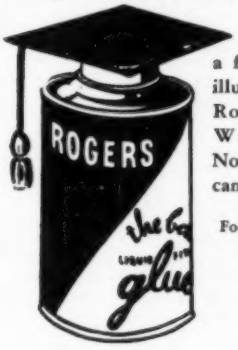

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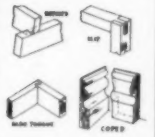

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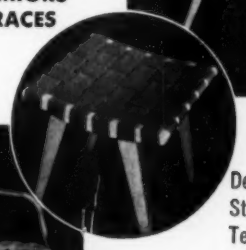

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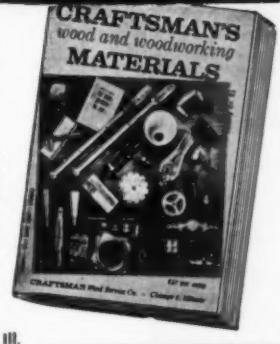

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Regular and nonflammable cements that bond on contact. Strong, water-resistant and heat-resistant. Best you can use for plastic laminates, plywood wall panels, leather, linoleum, synthetic rubber, thin gauge metal and all dissimilar materials. Comes in cans and drums from 1 pint to 5 gallons.

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Completely waterproof two-component resorcin resin glue forms a bond stronger than the wood itself. Resists continuous outdoor exposure, cold and boiling water, moist and dry heat, mold and fungus, solvents, acids and alkalis. Unbeatable for boats, outdoor furniture, sports equipment. Packed in ¼ pint to 5 gallon units.

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Chemically neutral, this powdered urea resin glue does not stain acid woods like oak or mahogany. It is highly water resistant and mixes easily in cold water. The perfect glue for fine furniture panels, cabinet work, veneering . . . any job where a clean glue line is important. Available in cans and drums from 1 to 100 pounds.

For complete information and prices, contact your supplier or write The Borden Chemical Company (a division of The Borden Company), 350 Madison Ave., New York 17, New York.

BUSINESS & PERSONAL NEWS

(Continued from page 46A)

resentative in the area, will be in charge, under the direction of the Black & Decker British subsidiary company in Harmondsworth, England.

SCHOLARSHIP AWARD ANNOUNCED

The James L. Lee Foundation announced that it has awarded a four year scholarship for the Printing Management Course of Rochester Institute of Technology to James Brigham, a senior in the Grand Haven, Mich., Senior High School. The scholarship will cover all tuition costs and contribute some toward other college expenses.

The scholarship is the first of what may be a series of such scholarships to worthy students in the Grand Haven Senior High School who have shown an interest in graphic arts and who wish to follow a career in the printing industry.

The James L. Lee Foundation was established by The Challenge Machinery Company in 1953 in commemoration of James L. Lee, one of the founders of The Challenge Machinery Company and its president from 1893 until his death in 1917, and of his great grandson, Lt. James L. Lee, who lost his life in World War II in an air combat mission over France in 1943. Lieutenant Lee, the grandson of J. Edgar Lee, President of The Challenge Machinery Company, and the son of J. Wesley Lee, Executive Vice-President and General Manager of the company was a graduate of the Printign Management Course at Carnegie Institute of Technology.

The Foundation helped establish the new Graphic Arts Department at the High School, of which James Brigham is now a student. Administration of the scholarship is being handled through the Grand Haven Public Schools.

Descriptive Material

NEW WALKER-TURNER BULLETIN

A new eight-page, photo-illustrated bulletin describing the new Walker-Turner line of woodworking jointers and other "light-heavyweight" woodworking machine tools has been issued by Rockwell Manufacturing Company's Walker-Turner Division. Complete specifications for the new tools are also included.

Included in the bulletin are descriptions and illustrations of the new jointer line, including new 6-in. and 8-in. jointers in various models. Two pages are devoted to the rest of the Walker-Turner woodworking line which covers 10-in. and 14-in. tilting arbor saws, 14-in. and 16-in. band saws, 12-in. lathe, cutoff saw, spindle shaper, belt and disk surfacer, 24-in. scroll saw and radial drill press.

Copies of the new bulletin may be obtained by writing.

(For further details encircle index code 0518)

MACHINE TOOL CATALOG

Brown and Sharpe Manufacturing Company have made available a completely new Machine Tool Catalog.

This 36-page illustrated catalog, designated as Catalog MT2, covers the company's entire line of Milling, Grinding, and Screw Ma-

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chines, and the various optional mechanisms and additional equipment available for the same.

Copies of this new catalog may be obtained from the manufacturer upon request.

(For further details encircle index code 0519)

1958 STACOR CATALOG

A new 24-page general catalog has been issued by the Stacor Equipment Company, manufacturers of Lifetime Quality drafting and school equipment, covering new lines, many new products, changes and additions in equipment.

Sizes, exact dimensions on each size, and other specifications are clearly tabulated for each piece of equipment. Drawings and photographs highlight design and appearance, and show details of construction, function, operation, and the many unique features of the Stacor units are described fully.

The catalog lists 19 flat files in three series types; new mobile storage units to make rolled blueprints, charts, drawings, etc., more readily available; 30 different drafting units in both wood and steel; drawing tables, reference tables, taborets, tracing units, all types of drafting and drawing equipment and accessories.

Copies of this new 24-page catalog are available.

(For further details encircle index code 0520)

NEW AUTO RADIO SERVICE DATA MANUAL – VOLUME 7

Howard W. Sams & Co., Inc., announce an addition to their Auto Radio Service Data Manual Series. This new addition provides complete photofact service data for the 56 auto radios produced in 1956 and 1957.

Complete information includes photo coverage, parts list, alignment data, standard notation schematics, and general servicing information. A handy index lists coverage in this volume and the six preceding Auto Radio Service Data Manuals. This specialized publication is a valuable asset for all service technicians.

Sold through electronic parts distributors, Auto Radio Service Data Manual, Volume 7, carries Catalog No. AR–7, and is priced at $3.75.

(For further details encircle index code 0521)

WILTON'S CATALOG NO. 691

A newly published catalog of Wilton Drill Press and Machine Vises is now being distributed by Wilton Tool Mfg. Co., Inc. Described in the catalog are a completely new Drill Press Vise and the latest design improvements in Wilton's MilOmatic air-hydraulic vise. MilOmatics are coming into wide use as automatic production fixtures. They provide instant, automatic clamping action, can be moved easily from machine to machine, and can be adapted to an unlimited variety of jobs with low cost jaw inserts.

Wilton Drill Press Vises are designed to provide huge jaw capacity within compact over-all dimensions. They are machined top, bottom, and sides for accurate 90-deg. hole drilling without a fixture. Six models are available, three of which have Wilton's patented Rapid Titan Nut, for free sliding action plus unlimited takeup.

Wilton Heavy Duty Machine Vises are also shown in the catalog, which may be obtained by writing to the manufacturer.

(For further details encircle index code 0522)

EICO 1958 CATALOG

Electronic Instrument Company have announced their new 16-page 2-color 1958 Catalog describing the complete EICO line of electronic test instruments and high-fidelity equipment in both kit and wired form.

(Continued on next page)

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Invaluable training course for TV instruction. 24-Lesson Section covers oscilloscope principles and application; power supplies; FM carrier waves, discriminators, ratio detectors; antenna principles and design; TV receivers; RF amplifiers and tuners; Video IF, detector, AGC and sweep circuits; cathode ray picture tubes, etc. Project Section includes nine basic projects translating theory into actual practice and so designed as to sustain interest. This effective TV manual contains 280 pages; 7½ x 11"; fully illustrated. Order *ED-21*, only.....$5.00

COLOR TV TRAINING MANUAL

For advanced students. Covers principles of the Color TV system, including colorimetry, make-up of the color signal; Color receiver circuits (chapters on every type of circuit used in the receiver); Color receiver servicing, including setting up the Color picture tube, alignment, trouble-shooting, test equipment required; also valuable appendices containing equations, vectors, color blocks and colorplates. A comprehensive Color TV training course. 260 pages; 8½ x 11"; profusely illustrated. Order *TVC-1*, only $6.95

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A complete, simple explanation of modern Television principles, operation and practice. Covers Cathode Beam Formation and Control; Beam Deflection Systems; Beam Modulation and Synchronization. Includes analysis of CR tube construction, camera tubes, voltage supplies, saw-tooth generators, sync circuits, control functions, receiving antenna circuits, RF input tuning systems, IF systems, AGC, etc. Fully illustrated; 208 pages; 8½ x 11". Order *TV-1*, only.....$3.00

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DESCRIPTIVE MATERIAL

(Continued from previous page)

The EICO Hi-Fi units described include: FM tuner, preamplifier, integrated and power amplifiers, and bookshelf and floor speaker systems.

The EICO test instruments described include: VTVMs, VOMS, oscilloscopes, tube and transistor testers, signal and sweep generators, battery eliminators, substitution boxes, flyback tester, battery tester, *R-C-L* bridge, electronic switch, voltage calibrator, geiger counter, and accessory probes.

A copy of the catalog may be obtained by writing for it.

(For further details encircle index code 0523)

BASIC SAFETY INFORMATION

General Scientific Equipment Company have announced Booklet No. 18, which presents basic safety information and suggestions to be used in the school shop or workshop. It emphasizes the necessity for safe work habits around machines, ladders, and electrical hand tools; the proper methods for lifting and carrying objects; and other points on shop safety.

The booklet is available without cost upon request.

(For further details encircle index code 0524)

SHOP EQUIPMENT NEWS

(Continued from page 60A)

easily in toolbox by service and maintenance men.

The No. 32 Quick Lock Vise is only 2 5/16 in., high and 7 in. long, with two bolt slots for quick attachment to machine or bench. Both sides as well as top and bottom are machined. This provides square surface for setting in any position, and can be easily adapted to jig work.

(For further details encircle index code 0513)

BATTERY ELIMINATOR AND CHARGER

Electronic Instrument Company, Incorporated, manufacturers of the EICO line of electronic test instruments and high fidelity equipment, announces production of the New 6V and 12V Battery Eliminator and Charger for servicing transistorized equipment, in both Kit and Wired Form.

Battery Eliminator and Charger

To provide the extra filtering needed for servicing transistorized equipment, the EICO model 1060 incorporates a special heavy-duty choke and filter capacitor circuit which takes the full continuous and intermittent rated current output.

Additional features of the new model 1060 are: two d.c. voltage ranges, 0–8 volts and 0–16 volts; continuous voltage adjustment with variac-type transformers; separate voltmeter and dual-range ammeter for simultaneous readings of both voltage and current; heavy-duty selenium rectifiers; fused primary; automatic reset overload relay for secondary; rugged, well-ventilated steel cabinet which may be wall mounted.

Information on numerous other fine features may be obtained.

(For further details encircle index code 0514)

TOLCO FUME HOOD

The Tolerton Company are introducing their new compact, portable Tolco Fume Hood, designed by scientists. It has exclusive features not found on more expensive competitive models.

Tolco Fume Hood

Particularly fine construction features include all Grade AA acid resisting baked-on porcelain enamel over aluminum — strong, durable, lightweight; safety glass front and rear windows trapped behind hood frame (rear window easily removable); handle for easy raising of hood — entire top opens — no clamps to undo — simply raise front window by finger channel — locks in raised position; large rubber feet providing firm foundation and keeps hood off bench to avoid contamination underneath; water inlet, gas inlet (chrome plated brass), floor drain below level of floor for easy washing; motor 115 volt a.c., 60 cycle, 55 cubic feet per min. high velocity exhaust blower; internal built-in fused wiring, light switches, blower switch, utility outlet for connecting heating jackets; and built-in two lamp flourescent lighting, with diffusing protective glass. Electrical chamber sealed against entry of explosive fumes.

Further details are available.

(For further details encircle index code 0515)

PORCELAIN-LIKE ENAMEL NOW IN THREE SERIES

Duracron — Pittsburgh Plate Glass Company's thermosetting acrylic porcelain-like baking enamel — first announced over a year ago is now being offered in three series made possible through continued research and chemical modification of the resins.

Added to the basic family of thermosetting acrylic resins, now known as Duracron Series 100, have been two new series, less costly and curable at lower baking temperatures. The new series, to be known as Duracron 200 and 300 resins, are said to possess slightly different but unique properties in the baking enamels field.

Duracron 100 Series

The basic 100 series, the Duracron super line, offers best all-round performance, com-

(Continued on page 52A)

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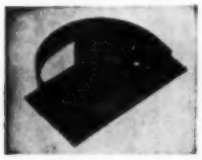

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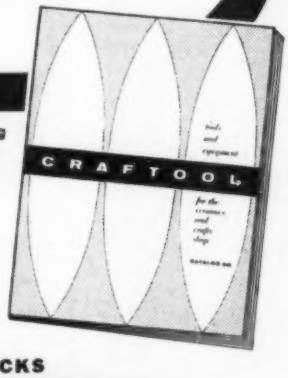

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SHOP EQUIPMENT NEWS

(Continued from page 50A)

bining hardness, color retention, and chemical resistance with outstanding flexibility and toughness. The 100 series is satisfactory for both exterior and interior applications. Baking schedule is 30 minutes at 350 deg. F. or equivalent.

Duracron 200 Series

The Duracron 200 series offers the most porcelain-like organic finish. It is very hard and stain proof. It is more brittle than the 100 series. It is recommended for interior use only. Baking schedule is 30 minutes at 300 deg. F. or equivalent.

Duracron 300 Series

The Duracron 300 series offers the most economical finish. Not equal to Duracron 100 and 200 in hardness, stain, and chemical resistance it is still superior to conventional alkyd-amine finishes. It has better flexibility than the 200 series. It is recommended for interior use only. Baking schedule is 30 minutes at 300 deg. F. or equivalent.

All three series of Duracron baking enamels are now available through Pittsburgh Plate Glass Company's industrial finishes sales division. Technical data is available on request.

(For further details encircle index code 0516)

"TRANS-MIDGE" 1-TRANSISTOR RADIO KIT

Allied Radio Corporation announces the release of their new, low-cost Knight-Kit "Trans-Midge" 1-Transistor Radio Kit. Only slightly larger than a cigarette package, the "Trans-Midge" offers excellent sensitivity and selectivity over the standard broadcast band. It requires the use of headphones and an external antenna.

"Trans-Midge" 1-Transistor Radio Kit

The "Trans-Midge" features an efficient, low-drain transistor; slug-tuned coil for high sensitivity and good separation of stations; external tuning knob; and impact-resistant plastic case styled in red. With its orderly chassis layout and clear instructions, kit builders should experience no difficulty in assembling this unit in a matter of hours.

This little radio will operate for months on the single penlight battery supplied. A standard type, the battery is easily replaceable anywhere.

The "Trans-Midge" is supplied complete with plastic case, all parts, transistor, wire, solder, battery, and instructions. Stock number is 83 Y 767; price is $2.45.

Available only from Allied Radio Corporation.

(For further details encircle index code 0517)

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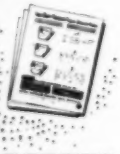

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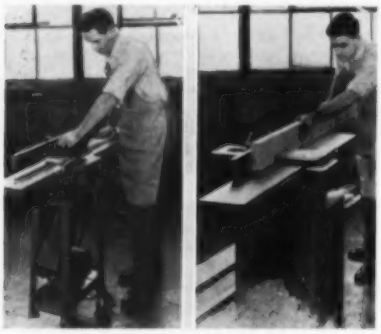
Shop Equipment News

NEW WALKER-TURNER JOINTERS

A new line of woodworking jointers consisting of 6- and 8-inch models has been introduced by Rockwell Manufacturing Company's Walker-Turner Division. They are both designed with emphasis on speed, accuracy, safety, and economy.

The new 6-inch jointer offers a longer bed and more convenient controls than earlier models but retains the exclusive Walker-Turner dual-purpose safety guard, all at lower cost than previous models.



Walker-Turner 6-in. and 8-in. Jointers

It is designed primarily for industrial shops, commercial woodworking shops, and schools, wherever accurate, safe, low-cost jointing is required.

Major features include the extra-long 42½ by 7-in. bed; rugged, independently adjustable table with precision-milled top; an extra large fence, moving across full width of bed for rabbeting; large, convenient handwheel table-elevating controls with dovetailed ways, adjustable gibs to compensate for wear, and easy-to-read scales, to assure accurate depth adjustment; a single control handle to position fence for both width and angle of cut; patented dual-purpose guard providing maximum safety for operator while permitting proper hold-down pressure directly over the cutterhead; and faster drive, providing more cuts per minute. Retractable casters and a rear knife guard for additional safety are available as accessories.

The 8-in. model is designed primarily to meet the requirements of furniture manufacturers, builders, cabinet shops, sash and door manufacturers, wherever fast, safe, economical production jointing is required. It also can be used in school shops.

Further information on many additional fine features of these two jointers is available.

(For further details encircle index code 0501)

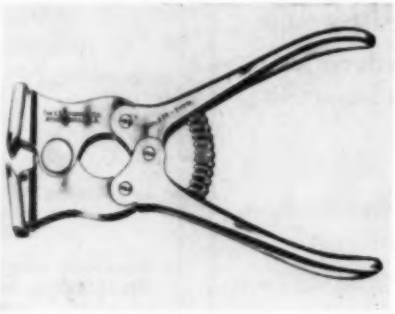
STARRETT CUT NIPPERS WITH CARBIDE TIPS

The L. S. Starrett Company are now offering cut nippers with jaws that can be removed, reground and adjusted, or replaced.

These nippers are now offered with Tungsten Carbide tips for extra long life.

Available as No. 1X for cutting wire, and as No. 235X with wider opening jaws for cutting tile, these cut nippers are of special design to insure powerful leverage for efficient cutting.

The jaws are secured in toothed seats by screws and may be removed and ground after becoming worn. Adjustment allows for grinding back each jaw up to ¼ in., before replacement is necessary.



New Starrett Cut Nippers with Carbide Tips

Several features insure good action and long life under severe usage. A stud and stop screw inside the handles holds the compression spring. The screw can be adjusted to limit the pressure on the jaws to avoid forcing them unnecessarily together.

Another safety feature is a flat spring behind the cutting edges of the jaws and forward of the joint. This spring forms a yielding seat and eliminates outward strain on the jaws, a common source of breakage in conventional cut nippers when the material being cut bears against a solid surface.

The head and handles are drop-forged steel, highly finished and all parts except the jaws are case-hardened.

A catalog describing these and many other Starrett Tools is available on request.

(For further details encircle index code 0502)

NEW "WOODMASTER" DRAFTING AND DRAWING EQUIPMENT

Stacor Equipment Company, manufacturers of Lifetime Quality equipment for the drafting room, schools, artists, libraries, etc., are offering a new line of hardwood drafting and drawing equipment. Called "Woodmaster" the new line offers both drafting and drawing tables in several models and features many new innovations.

Reinforced with steel, each piece is designed for maximum working efficiency and lifetime wear. Bases are made of selected hardwood finished in dark oak. Tops are of solid softwood thoroughly kiln dried, smoothly finished, sealed and lacquered. Board ends are protected with heavy gauge zinc plated steel end cleats.

The 4-post drafting tables are firmly secured with steel bolts. A three-receptacle electrical outlet with cord is mounted right in the frame for convenient attachment of lamp, eraser, and pencil sharpener. Drawers are of heavy gauge steel with wood fronts to match frame. They operate smoothly on steel rails and nylon glides, and will not stick, swell, or warp. Wide reference drawer and tool drawer equipped with tool tray, lock and 2 keys are standard equipment. A two-drawer auxiliary cabinet with supply and file drawers is optional and fits in perfectly to form part of the unit. Interlocking steel hinge allows table top to lift off easily.

Woodmaster Drafting and Drawing Equipment

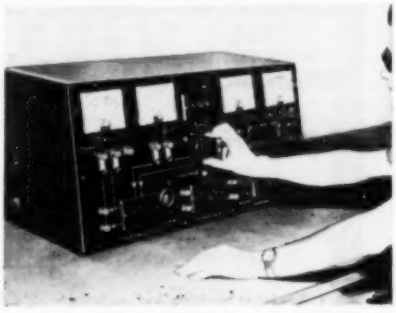
For further information on numerous other features, write to Stacor Equipment Company.

(For further details encircle index code 0503)

CROW ELECTRI-PANEL MODEL 625

Universal Scientific Co., Inc., are offering a variable a.c.-d.c., power supply plus an all purpose instrument test panel in one space-saving cabinet.

Called the Crow Electri-Panel Model 625, this new unit supplies 0/110 volts a.c., and d.c., continuously variable, at 7.5 amps maximum. Includes four large precision meters (d.c. ammeter 0/10; d.c., voltmeter 0/15, 0/150; a.c., ammeter 0/10; a.c., voltmeter 0/15, 0/150) for study of circuitry, electroplating, a.c., d.c., motors and generators, etc. Plug connections permit continuous output monitoring or separate use of all four meters. Each meter is fused for optimum safety.



Crow Electri-Panel Model 625

The Crow Electri-Panel eliminates the need for storage batteries. It can be used with Crow equipment or other electrical instruction equipment in lab, shop, and classroom work. Unit plugs into standard a.c. outlet, comes with complete instructions ready for immediate use. The 15 by 30-in. cabinet fits any workbench.

Full details are available.

(For further details encircle index code 0504)

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HOW TO MAKE BOWLS FROM FIBERGLAS CLOTH — POLYESTER RESIN

It's easy, fascinating work. Calls for inexpensive equipment. Students can make bowls of different shapes and sizes using remnants of drapery material, dress goods, even burlap, for decorative effects. Free literature gives instructions and prices.

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NEW ENGINE AND ELECTRICAL SYSTEM TESTING SET

Snap-On Tools Corporation have made available a new engine and electrical system

Engine and Electrical System Testing Set

tester, designed for accuracy, portability, and ease of use. Any mechanic with a minimum amount of instruction can use this equipment and obtain accurate readings. Each tester has a minimum number of adjustments and connections. There is no need for computations or allowances. No outside power (110 volt) is required, enabling their use anywhere, even outside of the garage.

Consisting of a generator-regulator tester, Tach-Dwell Meter, ignition analyzer, exhaust gas analyzer, 2 tune-up meter racks, and a roll stand, this set of testing equipment is extremely portable. Each meter rack holds two testers firmly in position yet permits immediate removal of meters when desired. The bases of meter racks have compartments for the storage of leads, adaptors, etc., while additional storage space is provided in the rear of the racks. The roll stand is 20 by 22¾ by 31 in. It has four 4-in. swivel casters for greater mobility. Made of heavy gauge metal, the stand has a ¾-in. thick finished plywood top. A 1-in. metal lip encloses the top on three sides to prevent tools and equipment from rolling or sliding off. The lower compartment is open in front and back for accessibility.

The generator-regulator tester handles all cars and most trucks in use today. This tester has a 15-volt range for popular cars and trucks, in addition to a 60-volt range for heavy duty ignition systems of more than 12 volts. The 60-ampere range handles any passenger car or truck in service today. No additional equipment is needed to test the full generator output without damage to this tester.

Combination Tachometer-Dwell Meter is designed for use on 6-, 12-, and 24-volt systems, and does the jobs of a Tachometer and a Cam Angle Meter. Color coded scales are easy to use and understand.

Further information is available.

(For further details encircle index code 0505)

THE VERIFAX BANTAM COPIER

Eastman Kodak Company has introduced a compact, 14-lb., office copier called the Verifax Bantam Copier.

This inexpensive Bantam, which has been available from Kodak Verifax dealers since

(Continued on next page)

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SHOP EQUIPMENT NEWS

(Continued from previous page)

The New Verifax Bantam Copier

March, accepts originals up to 8½ by 11 in. It embodies new simplicity of design and functional copying features, and is the first Verifax Copier to employ a curved glass platen.

With base dimensions of 13¼ by 17⅞ in., the Bantam makes the same multiple, photo-exact copies that typify all four models in the Verifax Copier line. Up to five copies of any typed, drawn, written, or printed original may be made on the Verifax Bantam Copier at a materials cost of about 2½ cents per copy.

Capable of making intermediates or masters on Verifax Translucent Copy Paper for use in diazo-type printers, the Bantam is also adaptable for use with the Verifax method of producing offset masters for office-type duplicators.

Due to its small base size, it can be placed within easy access of every secretary despite space restrictions.

Kodak now offers four desk-top copying units, which make five copies in one minute at a materials cost of 2½ cents per copy: the Verifax Copier Legal Size; the Verifax Copier Letter Size; the Verifax Signet Copier; and the Verifax Bantam Copier.

Additional information is available.

(For further details encircle index code 0506)

TILTING-ARBOR CIRCULAR SAW

Yates-American Machine Company, manufacturer of the J-line woodworking machines for schools and industry, have made available their 10-in. Tilting-Arbor Circular Saw J-125, with solid table extensions to provide firm, bigger-than-ever work surfaces. It now measures 48 $^{9}/_{16}$ in. to the right of blade.

Powerfully built to maintain constant blade speed, thus reducing kickbacks and increasing production, it is the only 10-in. saw that uses *standard* NEMA frame motor, up to 3 h.p.

It rips 3½-in. stock with blade at 90 deg., and has as much as 25⅝ in. of space in front of blade, with miter gauge extended.

The massive arbor transmits full power to the blade without loss, and without vibration. The former capacity of the saw has been almost doubled.

(For further details encircle index code 0507)

FOUR-STUDENT WALL SCIENCE TABLE

The Tolerton Company are offering the new Tolco Model TWL-1260 Table which is designed as a dual-purpose unit for use in the chemistry or physics departments or for use in a room combining both subjects. Designed to adapt to a wide variety of room layouts.

It features eight drawers — four large gen-

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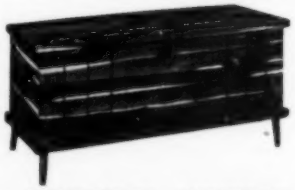

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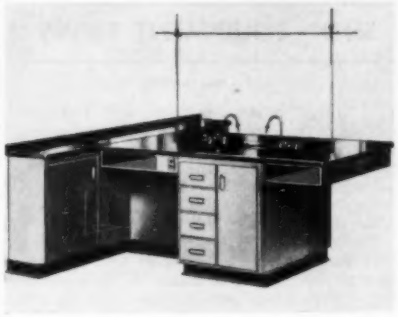


Four-Student Wall Science Table

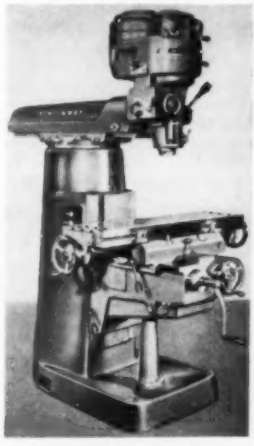
eral storage cupboards with adjustable shelves, and four book compartments. It is supplied with either a Tolco Carbonized top or a Tolstone top, both 1¼ in. thick.

Further information available from the Tolerton Company.

(For further details encircle index code 0508)

NEW CINCINNATI NO. 1-D TOOLMASTER MILLING MACHINE

The Cincinnati Milling Machine Company has just introduced a new member of the Toolmaster Milling Machine family. The new machine, No. 1-D, increases the size of family to four — other designations being 1A, 1B, and 1C.



Cincinnati No. 1-D Toolmaster Milling Machine

Column, knee, saddle, and table are common for the four styles. The knee-saddle bearing is the square-gibbed, center guide design. Extra wide knee-to-column bearing is approximately equal to the full width of the knee. Manual feed is standard, with power cross and table feeds available as extra equipment items. Electrical controls are built into a compartment at rear of column. Basic differences of the four styles will be found in the overarm and motor driven spindle head.

The 1-D Toolmaster spindle head is completely new. It is heavier than the 1A and 1B styles, and driven by a motor rated 50 per cent more power (1½ h.p., vs. 1 h.p.). No. 40 standard taper hole in the spindle and convential key drive permits the use of existing No. 40 taper shank cutters and col-

(Continued on next page)

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"A most excellent job of composition and presentation of many complex processes. The text material and photos are super. I feel that this book is a must reference book for anyone teaching in a technical-engineering field — vocational, technical institute or college level engineering I have found it helpful in answering student questions about processes they hear or read about outside of the classroom and which our present textbook does not cover." — **Fred Buehler, Mechanical Dept., Rochester Institute of Technology.**

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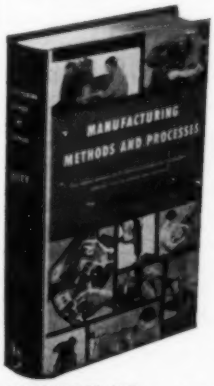

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SHOP EQUIPMENT NEWS

(Continued from previous page)

lets. A built-in draw-in bolt with a unique locking arrangement facilitates the changing of cutters. The operator merely rotates the spindle (while speed series lever is "neutral") to tighten the arbor shank. An interlock prevents the starting switch from being engaged while the draw-in bolt is locked.

The spindle is quill mounted, manual feed, with lever and fine handwheel feed controls. Power quill feed is available as extra equipment. This mechanism provides feed up and down, knob selected in three rates of .0015 in., .003 in., and .006-in. per rev. Spindle speeds are infinitely variable from 100 to 3800 r.p.m. A single crank type control selects the high and low series of spindle speeds at the side of the head. Power is transmitted by a belt running on variable pitch sheaves. A lever operated spindle brake stops the spindle in a few revolutions. The quill has an extra long range of 5 in. Quill clamp and scale and pointer for vertical setting are part of the quill mechanism.

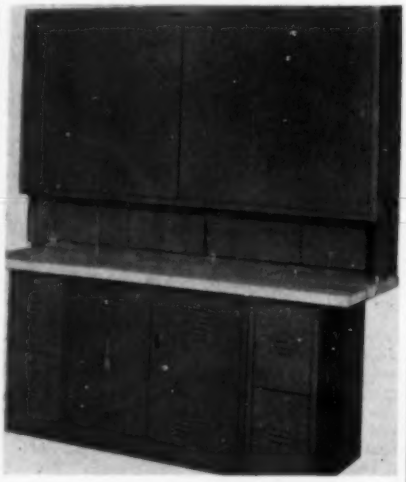
Many attachments and accessories are available, including Index Head, Precision Measuring Equipment, Shaping Attachment and others.

Complete information may be obtained by writing. Ask for Brochure No. M-2017.

(For further details encircle index code 0509)

"PARENT" COMBINATION BASE WORK BENCH WITH TOOL CABINET

Parent Metal Products, Inc., are the manufacturers of the No. 72-24-405BC-WTC Combination Base Work Bench with Tool Cabinet. The over-all size of the unit is 6 ft. long, 24 in. deep, and 6 ft. 8¾ in. high. The tool cabinet is 6 ft. long, 9 in. deep, and 48 in.



"Parent" Combination Base Work Bench with Tool Cabinet

high. Two tool storage compartments, each 36 in. wide, 9 in. deep, and 36 in. high are located 12 in. above the bench top. Masonite tool board is ¼ in. thick, having perforations punched on 1-in. centers, and is spaced ½ in. from steel back. Fifty tool hooks are furnished with the unit.

Compartments are equipped with sliding doors with cylinder lock. Bench top is 1¾ in., laminated edge grain maple. Base consists of

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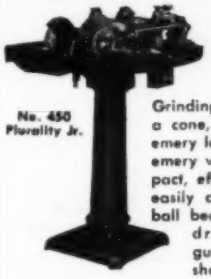

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No. 425 Plurality Sub Jr.
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Grinding can be done on a cone, coarse or fine or emery leather stropping or emery wheels. Unit is compact, efficient, serviceable, easily accessible and has ball bearing direct motor drive. Especially guarded for school shop use. Details on request.

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HANOVER, PENNSYLVANIA
Originators and Pioneer Manufacturers of Oilstone Tool Grinders

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INDUSTRIAL ARTS
APRONS & COATS

APRONS: APPROVED BY PARENTS
Dress your class in uniform protection.
ECONOMICAL
APRONS ARE A NECESSITY
Shop Organization Plan.
Full cut aprons, expertly constructed, 4 colors - 4 sizes. Plus BONUS APRONS. Details, material samples in Circular 29.

WRITE FOR CIRCULAR NO. 29

COATS: 2 Distinctive Styles
Expertly tailored. Top quality material. Designed exclusively for the Industrial Arts Teacher. In 5 colors. Details, material samples in Circular 29.

"The School Apron Folks"

CAN-PRO Corporation
29 EAST McWILLIAMS ST.
FOND DU LAC, WISCONSIN

two locker units of two lockers each and a cabinet base unit.

Locker size is 12 in. wide, 21 in. deep, and 15 in. high. Cabinet size is 36 in. wide, 21 in. deep, and 31 in. high, having one adjustable shelf and double swinging doors. All doors are equipped with spring hinges and padlock attachments, padlocks not supplied.

Flat key rim locks furnished at slight additional charge if specified. Natural lacquer finish on wood top; all-steel base finished in Standard Green Enamel. Base shipped set up, top and tool cabinet detached.

(For further details encircle index code 0510)

P & H LANCER WHITEPRINTER

P & H Sales Corporation announce the Lancer — a new, big and quiet, extra-width 45-in., 75 ft. per min., 100 watts per inch, fully automatic dry process whiteprinter.

Research-engineered by Peck & Harvey for today's reproduction needs, the new P & H Lancer is functionally designed and ruggedly built for modern, efficient, high volume dependability. "Copymation" is the term used by the manufacturer to describe the high degree of copying automation attained by this equipment.

P & H Lancer Whiteprinter

It automatically prints and develops blackline and blue-line cut sheets and roll stock to 45-inch width, up to 75 ft. per min., with full development at all speeds. Exclusive new P & H "Syncro-Flo" provides complete automation of ammo handling from remote supply. New Automatic Unidirectional Separator assures positive and flexible separation of originals and exposed prints. New Hi-Lo light intensity and speed correlator accessory automatically changes operating speed to 75 per cent of speed setting with simultaneous reduction to 75 per cent of full lamp intensity.

Front and rear delivery for volume production is standard. Has 6-in. diameter coolest contact revolving cylinder and 5000 watt jacketed quartz lamp. Oversize blower system assures efficient cooling and exceptional venting.

Full information on other outstanding features of the P & H Lancer Whiteprinter and bulletin No. 58LI is available.

(For further details encircle index code 0511)

LIFETIME STEEL MOBILE TUBULAR FILE

Stacor Equipment Company, manufacturers of Lifetime Quality drafting equipment, have introduced a new Lifetime Steel Mobile Tubular File. Named the Plan-Mobile, this attractive and compact storage unit safeguards valuable material yet keeps it instantly available for reference, and changes or additions.

(Continued on next page)

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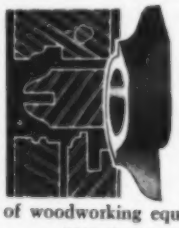

doors, kitchen cabinets, and formica. Saws, mortise chisels, planer, moulder and jointer knives, dovetail, countersink cutters, boring bits, vises, arbors, sanders. Two spindle dowel boring heads. Full line of woodworking equipment.

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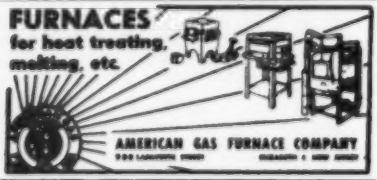

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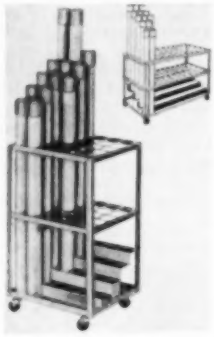
SHOP EQUIPMENT NEWS

(Continued from previous page)



Steel Mobile Tubular File

Precision-made of heavy gauge steel for lifetime wear and finished in hard-baked gray enamel, its dual tiered circular tube compartments hold rolled blueprints, charts, plans, drawings, maps, tracings, etc., neatly and firmly upright. A stepped bottom makes titles clearly visible, files readily accessible. Each opening is 2½ in. in diameter.

The Plan-Mobile moves easily and quietly on ball-bearing casters. It is available in two sizes: 30 file capacity which is 16½ by 14½ by 32 in. high; and a 60 file capacity, 54⅛ by 14½ by 32 in. high.

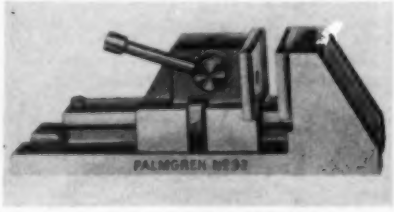
Also available for use with this handy mobile file are sturdy covered tubes with metal caps and bases, packaged in cartons of 30. The inside diameter of these tubes is 2¼ in., and they come in lengths of 43 in., and 55 in.

Further details, catalog sheet, etc., available from Stacor Equipment Company.

(For further details encircle index code 0512)

NEW PALMGREN NO. 32 QUICK LOCK VISE

The Chicago Tool and Engineering Company have announced the New Palmgren No. 32 Quick Lock Vise which is designed for production drilling, tapping, and assembly. This vise locks quickly and positively with the Palmgren cam and "Y" lock mechanism. The vise has no screw to be damaged by wear or breakage. Bearing and locking surfaces are hardened to give long service.



New Palmgren No. 32 Quick Lock Vise

Ideal for all operations requiring fast adjustment for various size pieces, only a flick of the locking lever is necessary to release the quick lock, and the movable jaw slides easily to any position. It weighs only 2½ lb., with 2⅛-in. jaw width, 1⅛-in. jaw opening, and 1¼-in. jaw depth. It can be carried

(Continued on page 50A)

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Code No.		Page No.
50	ADJUSTABLE CLAMP COMPANY .... *Jorgenson and pony clamps.*	12A
51	ALONDRA SALES, INC. ..... *Free wall chart on fuel pressure regulation. Use coupon, page 52A.*	52A
52	ALVIN & COMPANY ..... *Ready reference chart with decimal table. Use coupon, page 31A.*	31A
53	AMERICAN GAS FURNACE CO. ..... *Heat treating equipment.*	60A
54	AMERICAN TECHNICAL SOCIETY .... *Textbooks. Use coupon, page 55A, for on-approval copies.*	55A
55	AMERICAN WOOD TYPE MFG. CO. .. *Free catalog on graphic arts equipment and supplies.*	60A
56	ARMSTRONG BROS. TOOL CO. ..... *Tool holders.*	45A
57	ATLAS PRESS COMPANY, THE ..... *Precision machine tools.*	5A
58	BEDFORD LUMBER CO. ..... *Knockdown cedar chest and aromatic red cedar lumber.*	56A
59	BERGEN ARTS & CRAFTS ..... *Enameling, jewelry, and ceramics catalog. Request on school letterhead or send 25c.*	60A
510	BERGER SCIENTIFIC SUPPLIES CORP. .. *All-in-one drafting kits. Use coupon, page 41A, for literature and prices.*	41A
511	BESELER COMPANY, CHAS. ..... *Overhead projector. Free brochure.*	37A
512	BLACK AND DECKER MFG. CO. ..... *Quality electric tools.*	9A
513	BOARD OF EXAMINERS ..... *Teaching positions.*	60A
514	BOICE-CRANE COMPANY ..... *Power tools. Free catalog.*	12A
515	BORDEN CO., THE ..... *Glues for every job.*	48A
516	BRODHEAD-GARRETT COMPANY .... *Service units and tubular drawing tables.*	21A
517	BROWN & SHARPE MFG. CO. ..... *Precision tools.*	33A
518	BRUCE PUBLISHING COMPANY, THE .. *New text — Problems in Teaching Industrial Arts and Vocational Education.*	51A
519	BRUCE PUBLISHING COMPANY, THE ..... 3rd cover *New projects — arts and craft books — hobbies and handicraft*	
520	BRUNING CO., INC., CHARLES ..... *New whiteprinter. Use coupon page 42A for booklet.*	42A
521	CAMP MAH-KEE-NAC ..... *Camp counselor position.*	60A
522	CAH-PRO CORPORATION ..... *Aprons and coats. Write for circular No. 29.*	59A
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526	COLORADO STATE UNIVERSITY ..... *Summer school.*	53A
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528	CONSTANTINE & SONS, INC., ALBERT *Woods, tools, and materials.*	56A
529	COPE PLASTICS, D. W. ..... *New enlarged plastics catalog.*	47A
530	COPPER SHOP, THE ..... *Copper novelties.*	58A
531	CRAFTOOLS, INC. ..... *Tools and equipment for ceramics and craft shops. Free catalog.*	51A
532	CRAFTSMAN WOOD SERVICE CO. ... *Complete catalog on wood and woodworking equipment.*	47A
533	CUNNINGHAM CO., M. E. ..... *Safety wedge grip letters and figures.*	45A
534	DELMAR PUBLISHERS ..... *New books.*	48A
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537	DeWALT, INC., SUB. AMERICAN MACHINE & FOUNDRY CO. ..... *Power tools. Use coupon, page 10A, for free booklet and information.*	10A
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558	HARDWOOD CORP. OF AMERICA ... *School shop lumber. Catalog free.*	24A
559	HIGGINS INK CO., INC. ..... *American drawing inks.*	31A
560	HOME CRAFTSMAN PUBLISHING CO. *Shop books.*	43A
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May, 1958

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ADVERTISING INDEX

50	59	518	526	534	542	550	558	566	574	582	590	598	5106	5114	5122
51	510	519	527	535	543	551	559	567	575	583	591	599	5107	5115	5123
52	511	520	528	536	544	552	560	568	576	584	592	5100	5108	5116	5124
53	512	521	529	537	545	553	561	569	577	585	593	5101	5109	5117	5125
54	513	522	530	538	546	554	562	570	578	586	594	5102	5110	5118	5126
55	514	523	531	539	547	555	563	571	579	587	595	5103	5111	5119	5127
56	515	524	532	540	548	556	564	572	580	588	596	5104	5112	5120	5128
57	516	525	533	541	549	557	565	573	581	589	597	5105	5113	5121	5129
58	517														

NEW SUPPLIES AND EQUIPMENT

0501	0503	0505	0507	0509	0511	0513	0515	0517	0518	0519	0520	0521	0522	0523	0524
0502	0504	0506	0508	0510	0512	0514	0516								

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52	511	520	528	536	544	552	560	568	576	584	592	5100	5108	5116	5124
53	512	521	529	537	545	553	561	569	577	585	593	5101	5109	5117	5125
54	513	522	530	538	546	554	562	570	578	586	594	5102	5110	5118	5126
55	514	523	531	539	547	555	563	571	579	587	595	5103	5111	5119	5127
56	515	524	532	540	548	556	564	572	580	588	596	5104	5112	5120	5128
57	516	525	533	541	549	557	565	573	581	589	597	5105	5113	5121	5129
58	517														

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0501	0503	0505	0507	0509	0511	0513	0515	0517	0518	0519	0520	0521	0522	0523	0524
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(Continued)

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592	POST COMPANY, FREDERICK ..... *Drafting material and instruments.*	39A
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595	PROGRESSIVE "EDU-KITS," INC. .... *Practical home radio course. Use coupon for descriptive literature.*	58A
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597	REMBRANDT GRAPHIC ARTS CO. .... *Universal handpress.*	56A
598	ROGERS ISINGLASS & GLUE CO. .... *Glue. Free book of woodworking notes.*	47A
599	SALES SERVICE MACHINE TOOL CO. *Power hacksaws. New catalog.*	18A
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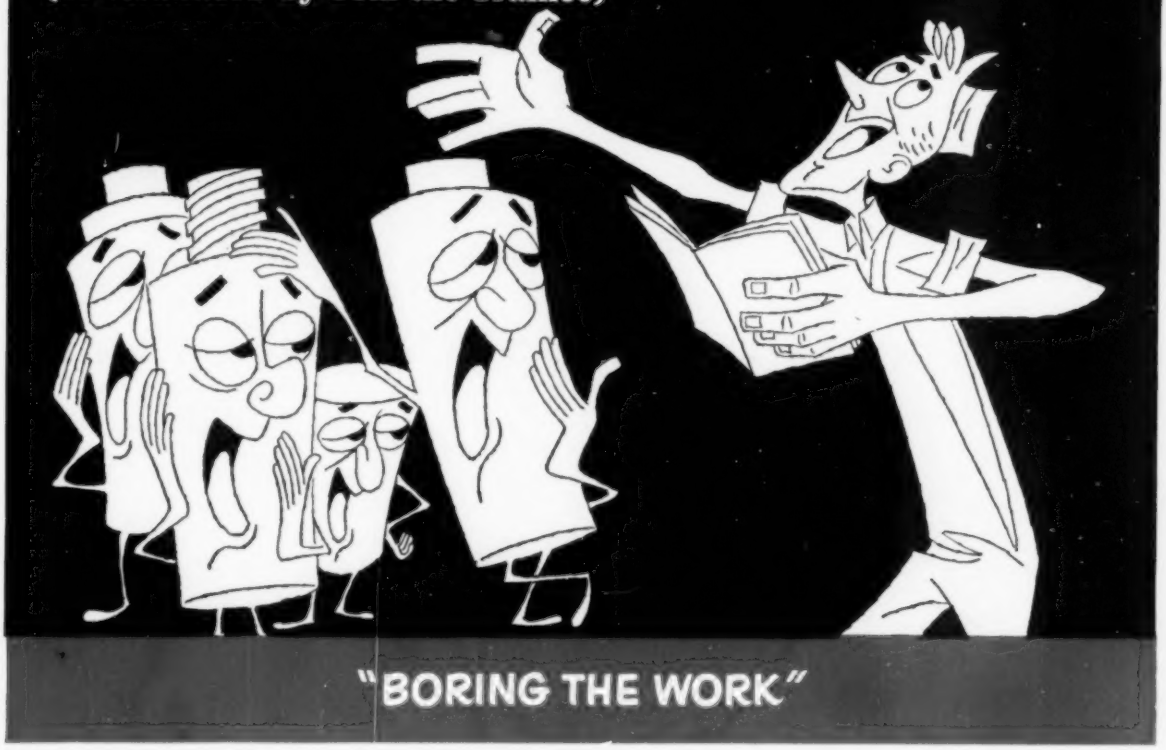
Turning Terminology

(as visualized by Tom the Trainee)



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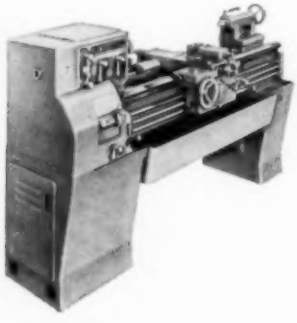

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